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Electrical Contracting

With Which Is Incorporated

The Electragist

March
1932

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It's Scale-Free*

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ELECTRIC WIRES ROEBLING AND CABLES

electrical contracting

VOLUME 31

WITH WHICH IS INCORPORATED THE ELECTRAGIST

NUMBER 5

CONTENTS FOR MARCH, 1932

John Wise	5
The Customer's Side of Inadequate Wiring	6
A. C. Voltage Drop by Clovis M. Converse	8
Trade Abbreviations by A. J. Allyn	11
Codification of Special Rules by H. J. Morton	13
55% Less Overhead	14
Beating the Depression	16
A Search for the Truth on Merchandising	17
Editorials	18
Code Chats	20
A.E.I. Activities	28
In the Editor's Mail	34
Suggested Resale Prices	37
Contracting News	72
Practical Methods	90
Manufacturer's News	96
Index to Advertisers	102

RESALE PRICE NEWS

Price adjustments have been made on several items in the Price Service due to manufacturers' new discounts, and new prices. Increases in price will be found on the following items:

Black and galvanized conduit
Elbow or bend, couplings, bushings and locknuts
Lead and rubber covered wire and cable
Non-metallic Parkway cable

Reductions will be found in prices on the following items:

Sectional switch boxes with brackets or extended ears or lath supports
Threaded composition bushings (2 in. size and over)

Type "A" steel surface cutout boxes
Armored service cable condulets
New Code R.C. wire
Larger size D.B. stranded wire
Circular mill cable

Latox 2-conductor cord, 2 $\frac{1}{2}$ and 2 in. sizes on F & LB types form 6 condulets, commercial glassware for use with Alabax units, chromium plates for tumbler switches and No. JX-5103 Bryant connectors, are all new items added this past month in the resale price section.

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Material furnished by Capitol Electric Supply Co.,
Lansing, Mich.; Electrical Contractor, Barker-Fowler
Electric Co., Lansing, Mich.; Mechanical and Elec-
trical Engineer, Wm. W. Bradfield, Grand Rapids, Mich.

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maintenance

In its program of encouraging industrial electrical contractors to regain industrial plant business that was lost because a plant electrician was employed, ELECTRICAL CONTRACTING has frequently been asked whether there was any limit to the size of plants that should be taken over by the contractor.

This is not a question that can be answered positively. It is a question, however, that must be given careful consideration by all branches of the electrical industry.

In the first place the electrical wholesaler has been encroaching on the contractor's territory for some years. In order to secure direct customers he has been responsible for most of the plant electricians.

Of late, the wholesaler has branched out further and sold at wholesale to stores, machine shops and the smaller industrial and commercial customers.

Before the cooperation of the wholesaler can be secured he must be urged to find out how costly this excursion into the contractor's territory has been.

When the wholesaler has this information, and the realization that after all he will get the business anyway, he will most likely pare down his list of wholesale accounts.

The manufacturers of motors have been studying the situation and as a result the motor specialists are experiencing less competition from manufacturers.

The other electrical manufacturers will have to learn the same lesson.

There are frequently some very nice orders that come out of a moderately sized industrial plant. In between such orders, however, are months and maybe years of very small pick up orders. No manufacturer can afford to handle them and yet any manufacturer who has once sold a nice order at wholesale is more or less forced to continue to contact the account.

There is only one way out and that is for manufacturers to classify accounts that they are going to sell direct and that is on the basis of service to the customer.

And now as to the size of the plant that an industrial contractor might handle, we feel that the answer lies entirely in what the contractor has to offer.

Some of the largest industrial plants in the country are being serviced entirely by electrical contractors solely because the plant managers were convinced that the work could thus be done more economically, and better.

Where an industrial plant is large enough to maintain a crew of competent electricians and a foreman of ability, and the department is run efficiently and economically, the contractor will have virtually nothing to offer.

On the other hand, there is hardly a plant employing a single electrician that cannot better afford to employ the services of an industrial electrical contractor.

It is this latter class of business that the manufacturers, the wholesalers and the contractors can agree on and therefore as the market of least resistance should, in the opinion of ELECTRICAL CONTRACTING, be approached first.

The servicing of this market by the electrical contractor will save the industrial plant's money, will reduce the selling costs of both wholesalers and manufacturers and provide a profitable outlet for the electrical contractor's services.

When business was booming the matter of sales cost was passed over with the remark—"we had to have the business. If we didn't get it one of our competitors would."

Times are different now and the lesson of sales cost has been forced on everybody with the result that more and more manufacturers are beginning to appreciate the value of the electrical contractor in the development of profitable industrial sales.

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Direct glare: Resulting eye-strain retards production.



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NUMBER 5

electrical contracting

IN WHICH IS INCORPORATED THE ELECTRAGIST

MARCH
1932

**Rikki
Tikki
Tavi...**

by
**JOHN
WISE**

YOU hear and read a lot of guff about what terrific fighters lions and tigers are, and how they are "Kings of the Jungle." I'm willing to admit they are tough when cornered, but, generally speaking, they are just plain yellow—always picking on the weak and hitting mostly from behind.

My idea of a real scrapper is just a couple of pounds of overgrown weasel that hangs around the dak-bungalows in India—His Majesty the Mongoose. This baby is not only one of man's best friends and the world's classiest battler, but he is the last word in specialization. His only idea in life is to kill snakes, especially cobras, whose poison is always fatal. The bigger and tougher they are the better he likes it, and for singleness of purpose and deadly execution he has no equal.



When a mongoose gets sore he gets sore all over; his eyes turn blood-red, his hair stands straight up and he sounds his battle-cry by clicking his teeth, so the natives call him "Rikki-tikki-tavi—the killer who never lets go." The wonderful thing about his cobra killing is that he is not immune to the snake's poison—one scratch on his schnozzle and he's the deadliest corpse they ever put on ice. Yet he always starts the battle and has never been known to lose.

The mongoose simply ducks the cobra's lunges till the snake gets tired of missing, then suddenly sinks his teeth in the throat behind the head and never lets go till the body is ready for the dinner-table. Besides reading up on this animal, I saw one of these battles in a moving-picture. When it was over and the mongoose was yelling to his wife and kids: "Porterhouse for supper, folks!" I says to myself: "There's a gink to write home about! He knows his work thoroughly, doesn't waste an ounce of energy or a second's time in completing the job, and once he goes after a contract, he never gives up. He never wants for work because when he cleans the snakes out for one family they give him a farewell banquet of bananas and he goes to the next bungalow."

Now look how neatly that description fits the right kind of electrical contractor. I mean the kind of man who goes after difficult work and studies it so well that no obstacle is too tough, thus qualifying as an expert and making customers anxious to secure his services. Then add sticktoitiveness and the ability to hold the death-grip to the end of a hard struggle and you have a real combination. Hats off to Red-eyed Rikki, and may we all take a leaf from his book.

the
customer's
| side of
inadequate
| wiring

A building with wiring that constricts and interferes with an abundant flow of energy is like a man with hardened arteries. Some buildings, inadequately wired from the beginning, are prematurely old electrically. Others, in which the demands for electric service have increased so that they exceed the normal capacity of the equipment originally installed, suffer from poor electrical circulation and find themselves handicapped in comparison with their more adequately wired neighbors.

Wiring must be adequate, not only to carry the electrical load, but to carry it without excessive loss of energy in the wiring itself. Just how poor wiring affects the economic production of illumination may be seen from the animated charts, which have been worked up by G. S. Merrill, of the Nela Park Engineering Department of the General Electric Company.

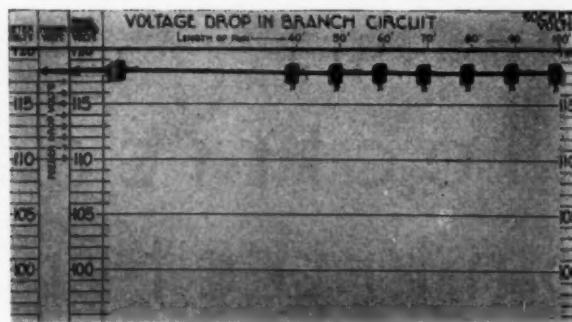


Fig. 1—At no-load the panel-board and socket voltage is identical with the service voltage at the meter.

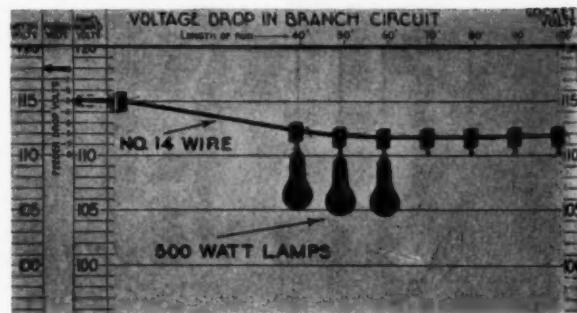


Fig. 2—A 1,500-watt load at 50 ft. from the panelboard causes undervoltage operation of lamps.

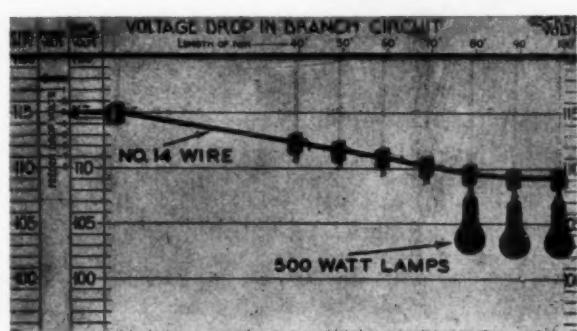


Fig. 3—A 1,500-volt load centered at 90 ft. from the panelboard causes more serious undervoltage, the effect of which is shown.

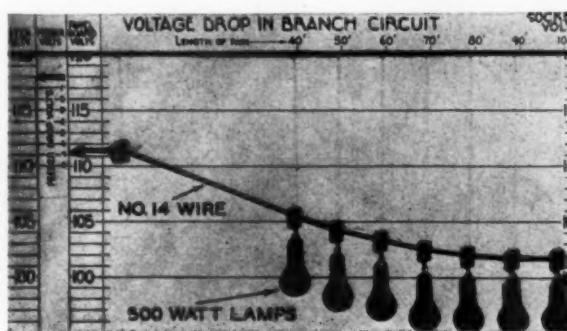


Fig. 4—Heavily overloaded circuits are not uncommon, but such conditions result in gross inefficiency of lighting and high unit cost of light.

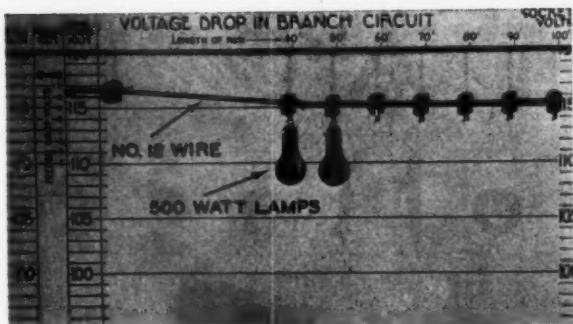


Fig. 5—Initial loads should be limited to 1,000 watts, using No. 12 wire for runs up to 50 ft.

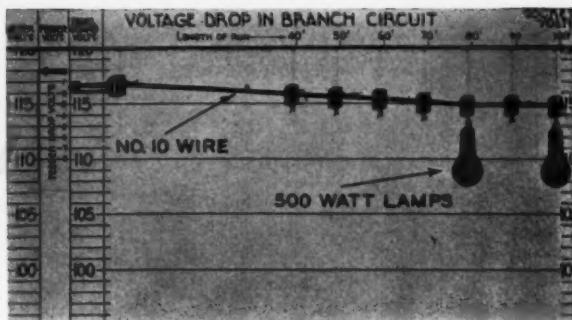


Fig. 6—For lengths of runs between 50 and 100 ft. No. 10 wire should be used for an initial load of 1,000 watts per circuit. Normal operating voltage at the socket is maintained.

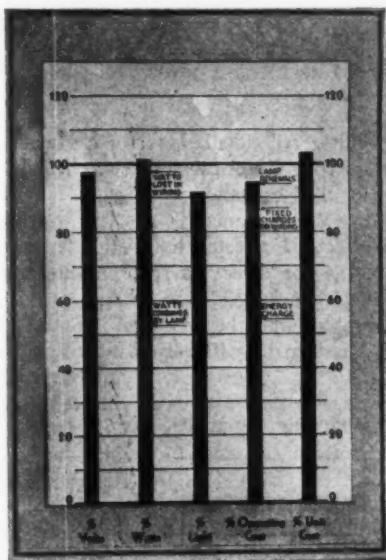


Fig. 7—When lamps burn undervoltage, due to voltage drop in branch circuit wiring, the light output decreases more rapidly than the wattage with the result that the unit cost of light is increased.

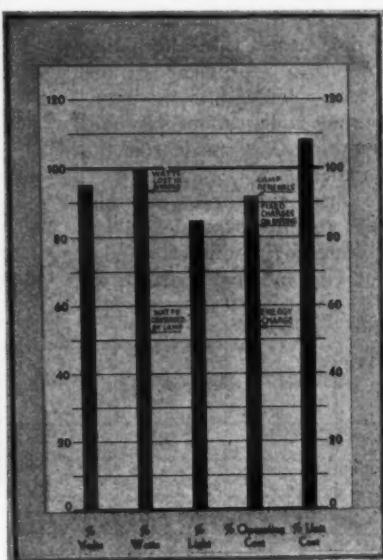


Fig. 8—Each increase in voltage drop decreases the light output rapidly with a resultant rise in the unit cost of light.

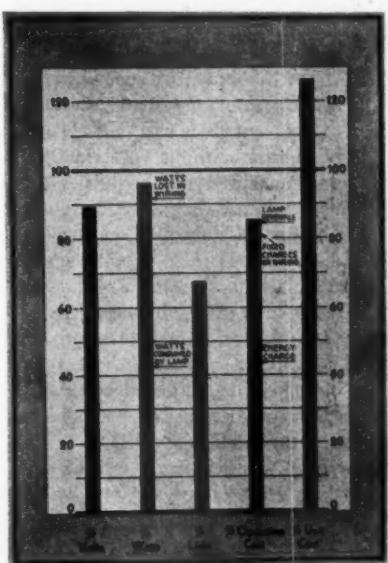


Fig. 9—With excessive undervoltage burning of lamps not only is the light output reduced, but the light emitted by the lamp is of poor color quality. With further voltage drop the high-efficiency lamp of today approaches the value of the old carbon lamp of a quarter-century ago.

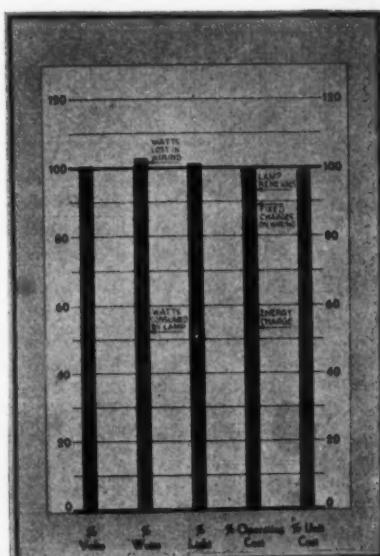


Fig. 10—Lamps operated at their design voltage produce light most economically, giving a resultant low unit cost of light—"most light for the least cost."

AC voltage drop

CALCULATION of the drop on a direct current circuit is quite simple and tables showing the voltage drop, or the size of wire to provide a certain drop, can be easily made up and are simple to use. On alternating current circuits, however, the problem is more complicated; many factors enter into these calculations and a simple table cannot be used unless certain assumptions are made and its limitations clearly understood.

Single phase, two phase and three phase circuits will obviously require separate tables. These may be complicated by modifications such as three phase, four wire and two phase, three

by CLOVIS M. CONVERSE

wire circuits. All calculations for a given load and distance will depend on four factors which are as follows:

1. Resistance
2. Reactance
3. Capacitance
4. Skin Effect.

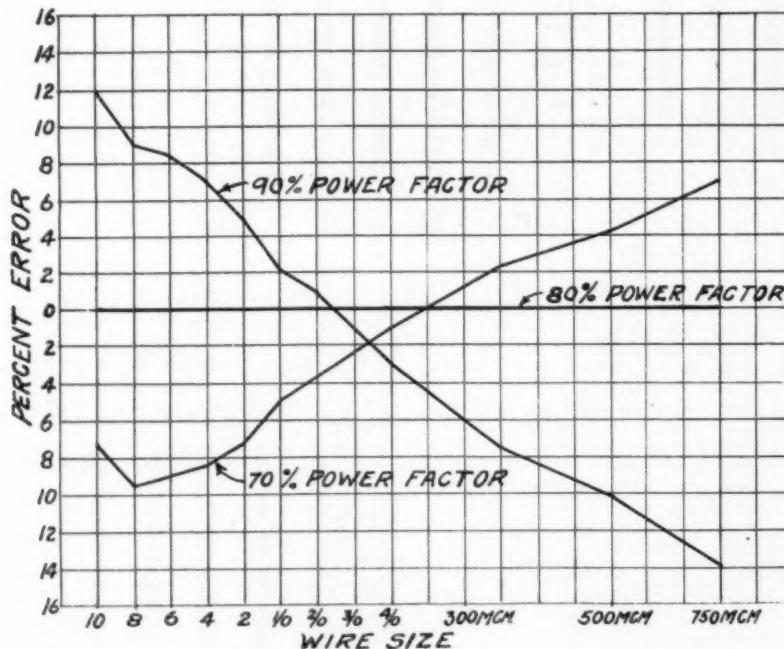
The effect of resistance in an alternating current circuit is the same as for direct current circuits and for ordinary lighting loads, that is loads of 100 per cent power factor, direct current tables may be used. A slight error is introduced by entirely disregarding the effect of reactance but this error will not exceed one per cent of the calculated drop.

Reactance is the factor that must be given serious consideration when the power factor departs from 100 per cent, as it does on most power circuits. Since reactance is a result of the effect of the current in one wire upon another due to induction, it is obvious that it will depend upon the spacing of the conductors, the frequency of the circuit and the power factor for any given load or distance.

With conductors spaced as they are for interior wiring, the effect of capacitance can be entirely neglected without introducing a measurable error. Skin effect, which is the drop in a conductor due to self induction, can also be disregarded unless very accurate calculations are necessary. The error introduced by skin effect is negligible on sizes below 4/0. On 500 MCM. cable skin effect will increase the actual drop by 2.2

per cent, while on 1000 MCM., cable the actual drop, will be increased 5.4 per cent. Since the actual load on a 1000 MCM. cable can seldom be estimated within 10 per cent, it will be seen that the error due to disregarding this factor is well within this figure.

Because sixty cycle, 3-phase, three wire circuits and single phase, two or three wire circuits are most commonly used, this



CURVES SHOWING ERROR CAUSED BY ASSUMING 80% POWER FACTOR

TABLE I: FOR THREE VOLTS LOSS SHOWING SIZE WIRE B. & S. GAUGE OR AREA IN 1000 CIRC. MILS. FOR 3-PHASE, THREE WIRE CIRCUITS BASED ON 3 R. C. WIRE, IN IRON OF SIZE AS REQUIRED BY NATIONAL ELECTRICAL CODE

Amperes	80	90	100	110	120	130	140	150	175	200	225	250	275	300	325	350	375	400
25.	10	10	8	8	8	8	6	6	6	4	4	4	4	4	3	3	3	2
50.		6	4	4	4	4	4	4	3	2	2	1	1	1/0	1/0	2/0	2/0	2/0
75.		4	3	3	2	2	2	2	1	1/0	2/0	2/0	3/0	3/0	4/0	4/0	250	250
100.					1	1	1/0	2/0	2/0	3/0	4/0	4/0	250	300	350	350	400	
125.							1/0	2/0	2/0	3/0	4/0	4/0	300	350	400	500	500	600
150.								2/0	3/0	3/0	4/0	250	300	400	500	600	750	750
175.								3/0	4/0	4/0	300	350	400	500	600	750	750	
200.								4/0	4/0	250	350	400	500	600	750			
225.								4/0	250	300	350	400	500	600	750			
250.									250	300	350	400	500	600	750			
275.									300	350	400	500	600	750				
300.									350	400	500	500	700					
325.									400	500	500	600	750					
350.									400	500	500	600	750					
375.									500	600	700	750						
400.									500	600	700	750						
425.									600	700	750							
450.									600	750								
475.									700	750								
500.									750									

article will be devoted to a discussion of the drop in such circuits. A 3-phase, four wire, circuit can be considered as a simple 3-phase circuit. As stated, the reactance at sixty cycles for any given load and circuit length is dependent on the spacing of conductors and the power factor of the load. A balanced load will be assumed as no simple calculations can be made to cover unbalanced loads.

The spacing of conductors in the ordinary interior wiring system, using rubber insulated wires in iron conduit, is fixed, approximately, by the Code rule specifying the sizes of conduit for the usual combinations of wires of a given size. True, the actual spacing may be increased slightly by the use of oversize conduits, or changed by the fact that some conduits are vertical and others horizontal; but the errors introduced by such factors will certainly not exceed 5 per cent and in many cases will offset each other. Thus we may safely assume a triangular spacing of conductors, which will be the average of the maximum spacing, assuming all conductors in contact with the interior surface of the conduit and the minimum, assuming all conductors in contact. Using these spacings as a basis and the regular handbook tables of reactance, a value of reactance per 1000 ft. of circuit, per ampere, can be set up which can be used to calculate the drop on feeders installed under Code requirements.

On a mixed load, or a power load, the power factor may vary from 70 per cent, or less, to 90 per cent. It is probably fair to assume 80 per cent power factor as an average value. Since the reactance varies with the power factor and the ratio is different for each size of wire; what error can be expected if a table is made up for 3-phase circuits based on 80 per cent power factor? The curves in the diagram show the percentage increase or decrease in drop for 70 per cent and 90 per cent power factor with 80 per cent taken as a base. It will be noted that sizes for 1/0 to 350 MCM. the error due to a

The Table may be used for a drop of more or less than three volts by readjusting the circuit length in proportion to the drop desired. For example if a drop of 6 volts is permissible, one half of the feeder length can be used and the size read directly from the table. Assume a load of 150 amp. and a circuit length of 300 ft. for 3 volts drop the table shows 500 MCM. For six volts drop reduce the circuit length to 150 ft., the table then shows No. 3/0 wire as the proper size to use. For a drop of 4½ volts on the same circuit, use a length of 200 ft. and the table will show a size of 250 MCM.

$$\begin{aligned}
 C &= \text{CIRCUIT LENGTH IN FEET} \\
 \text{FORMULA: } D &= \text{ACTUAL DROP IN VOLTS} \\
 C &= \text{ACTUAL CIRCUIT LENGTH} \\
 C &= \frac{D}{3} \times C
 \end{aligned}$$

10 per cent increase or decrease in power factor, is less than 5 per cent of the calculated drop. On sizes from No. 10 to No. 1 and from 350 MCM. to 750 MCM. the error, with two exceptions, is 10 per cent or less.

To sum up the situation: if a table is made up for sixty cycle, 3-phase, a.c. circuits, with wires installed in conduit in the usual manner, assuming 80 per cent power factor and disregarding skin effect, the results will be within 10 per cent of correct, even if the power factor varies 10 per cent from the figure selected. For example, if the calculated drop is 10 volts for a given circuit, we may be sure that the actual drop will be, not less than 9 volts, or more than 11 volts. Since loads cannot usually be estimated within 10 per cent, and since calculations which disregard reactance may introduce errors of 100 per cent, it would seem that such a table will be of practical value, if the user understands the basis on which it is computed and its limitations.

Table I above shows the size of conductor required in a 3-phase, three wire, sixty cycle circuit at 80 per cent power factor, to limit the drop to 3 volts, or less, assuming rubber insulated wire in iron conduits of the usual size.

Given the load in amperes and the length of the circuit in feet the size wire to use may be read directly from the table.

One question may be somewhat troublesome, that is the method of determining the ampere load. For circuits involving power only, use the sum of the rated currents for each motor. This figure may seem a little high as drop is usually calculated on the basis of average load, however it provides some protection against excessive drop during the starting period of motors. If a load is given in kilowatts, 80 per cent power factor may be assumed and the current per wire calculated from the formula:

$$\text{AMPERES} = \frac{\text{KILOWATTS} \times 1000}{\text{VOLTS} \times \text{POWER FACTOR} \times 1.73}$$

The figure thus obtained will represent the maximum value of current as the full load power factor will seldom exceed 80 per cent. If the power factor is lower on light loads the load current will also be less.

On a single phase, two or three wire circuit, the

power factor will seldom go as low as 80 per cent so that the table given cannot be used. As previously stated, on most loads of this type results calculated as for direct current are satisfactory. On certain loads there is a possibility that the power factor may go below 100 per cent due to a small percentage of inductive load. Large modern office buildings with a great number of fan motors and motor driven appliances may present such a problem. Little or no data is available on this subject but it may be well to show what effect will be produced if this type of feeder should operate at 90 per cent and 95 per cent power factor.

Part of the table published in *ELECTRICAL CONTRACTING* for January, 1931 (Table II), is reproduced. This table shows the length of circuit permissible for 3 volts drop. A table of factors is given showing the amount these lengths will be increased or decreased if the power factor becomes 95 per cent or 90 per cent to maintain the same drop. This table and the factors given can be applied to each phase of a 2-phase four wire circuit.

TABLE II: LENGTH OF CIRCUIT FOR THREE VOLTS LOSS DIRECT OR ALTERNATING CURRENT AT 100% POWER FACTOR

Amperes	#4 41,740 c. m.	#3 52,630 c. m.	#2 66,370 c. m.	#1 83,690 c. m.	#1/0 105,500 c. m.	#2/0 133,100 c. m.	#3/0 167,800 c. m.	#4/0 211,600 c. m.	250,000 c. m.	300,000 c. m.	400,000 c. m.	500,000 c. m.	600,000 c. m.
25.....	232	292	369	465	.....	.....	.....	.....	.....	.....	.....	.....	.....
50.....	116	146	184	232	293	370	466	.....	.....	.....	.....	.....	.....
70.....	83	104	132	166	209	264	333	420	496	.....	.....	.....	.....
100.....	116	147	185	233	294	347	417	.....	.....	.....
125.....	117	148	186	235	278	333	444	.....	.....
150.....	123	155	196	231	278	370	463	.....
175.....	133	168	198	238	317	397	476	.....
200.....	147	174	208	278	347	417	.....
225.....	131	154	185	247	309	370	.....
250.....	139	167	222	278	333	.....	.....
275.....	152	202	253	303	.....	.....	.....
300.....	185	231	278	.....	.....	.....
325.....	171	214	256	.....	.....	.....
350.....	198	238	.....	.....	.....
400.....	174	208	.....	.....	.....	.....
Based on the formula: C. M. $21.6 \times L \times I$													
L—Length of circuit in feet I—Load in amperes 21.6— 2×10.8 (Twice the resistance of 1 mil. ft. of copper) 3—Loss or drop in volts													

SIZE WIRE B. & S.	95% POWER FACTOR	90% POWER FACTOR
#4	1.002	1.031
#3	.991	1.012
#2	.975	.990
#1	.956	.965
#1/0	.942	.942
#2/0	.905	.899
#3/0	.875	.857
#4/0	.846	.818
250,000 C. M.	.777	.743
300,000 "	.762	.707
400,000 "	.681	.625
500,000 "	.647	.584
600,000 "	.603	.538

TABLE OF FACTORS

To show the use of this table assume a load of 200 amp. and the size wire as 4/0. From the table the circuit length for 3 volts loss will be 147 ft. If the power factor is 95 per cent the length will be $.846 \times 147$ or 124 ft. At 90 per cent power factor the length becomes $.818 \times 147$ or 120 ft. That is, the length given in the table multiplied by the factor for that size wire will give the length at the power factor assumed.

trade abbreviations

BY A. J. ALYN

The different branches of the electrical industry from time to time have tried to standardize abbreviations for their own particular use. The electrical contractor, however, has been left to his own devices though his needs are as important as those of his allied brethren.

Whenever time or space is to be saved in writing a description, abbreviations must be used. These abbreviations should be brief, descriptive, and easy to memorize.

The general scheme used in the makeup of this table of abbreviations, is as follows: Where two or more words are used in one abbreviation, two or more capital letters are also used; when a manufacturer's name consists of two or more words, the abbreviation is hyphenated; abbreviations in common usage remain unaltered; no periods are used.

In the following table the abbreviations are listed alphabetically, and due to the small number under any one letter, no cross index is considered necessary.

A

A—ampere
A-B—Allen Bradley
A-B-B—American Brown Boveri
AC—alternating current
A-C—Allis Chalmers
ACB—air circuit breaker
A-D-T—American District Tel
Ahr—amperehour
al—aluminum
alt—alternate
Am—ammeter
ann—annunciator
aprx—approximately
apt—apartment
Arch—architect
armd—armored
auto—automatic
aux—auxiliary
avg—average

B

BA—bell alarm
bak—bakelite
bbl—barrel
BC—back connected
bd—board
ndl—bundle
Benj—Benjamin
bk—back
bkt—bracket
blk—block
bldg—building
bldr—builder
blk—black
br—brass
BrBr—brush brass
brch—branch
brk—breaker or brick

Bry—Bryant
brz—bronze
bshg—bushing
bsmt—basement
BX—armored cable

C

/c—conductor
cab—cabinet
cart—cartridge
cat—catalogue
CB—circuit breaker
cbl—cable
cert—certain
cg—centigram
ch—chain
C-H—Crouse Hinds
chem—chemical
C-Hm—Cutler Hammer
circ—circular
CI—cast iron
ckt—circuit
clsg—closing
clk—clock
cm—centimeter
CM—circular mills
cndsr—condenser
CO—cutouts
col—column
comb—combination
comp—compensator
comp—compartment
compl—complete
compo—composition
conc—concrete
concl—concealed
cond—conduit
cond—conductivity
cont—control
(cont)—continued
contr—contractor
const—construction

conv—converter
cop—copper
corp—corporation
corr—corridor
cov—cover
cp—candlepower
cplg—coupling
CS—cable support
CT—current transformer
CtoC—center to center
cu—cubic
cwt—hundred weight
cyc—cycle
cyl—cylinder

D

DB—double braid
DC—direct current
deg—degree
dept—department
det—detail
DD—disappearing door
D-H—Diamond H
diam—diameter
DinD—door in door
diff—differential
dir—directional
disch—discharge
dist—distribution
do—ditto
doz—dozen
DP—double pole
2P—double pole
dp—deep
Dr—doctor
dwg—drawing
dup—duplex

E

ea—each
E-C-M—Electric Controller
ed—edition

Edw—Edwards
el—elevation
elec—electric
elm—element
eng—engine
Engr—engineer
eq—equal
eqt—equipment
etc—etcetra
exc—exciter
exp—exposed
ext—external
extg—existing

F

FA—fire alarm
F-A—Frank Adam
Fahr—Fahrenheit
fdr—feeder
FFu—front fused
fig—figure
fin—finish
fixt—fixture
FKSw—fused knife switch
fl—flush
fld—field
flex—flexible
flr—floor
flt—float
frmwk—framework
FOB—free on board
Freq—frequency
ft—foot
'—foot
ft-c—foot candle
ftg—fitting
ft-lb—foot pound
fu—fuse
furn—furnish
fut—future

G

G-W—G & W Electric
ga—gauge
gal—gallon
galv—galvanized
G-D-F—General Devices
G-E—General Electric
gen—general
gen—generator
gm—gram
G-M—General Motors
gnd—ground
gov—governor
govt—government
GPM—gallons per minute
graf—graphic
grd—grade
grfld—greenfield

H

hr—hour
H-C—Holtzer Cabot
H-H—Hart & Hegeman
H&L—high and low
HD—heavy duty
hdwhl—handwheel
hex—hexagonal
hldr—holder
hngr—hanger
horz—horizontal
hotDp—hot dipped
HP—horse power
hse—house
HT—high tension
ht—height
Hubb—Hubbell
hydr—hydraulic

I

I-C—Industrial Controller
IHP—indicated horse power
"—inch
incl—including or inclusive
Ind—indicator
ind—indicating
ins—insulator or insulation
insp—inspector
,inst—instantaneous
instl—install
insul—insulated
int—internal
inter—intermediate
intcn—interconnection
ITE—ITE Co
ITL—inverse time limit

J

JB—junction box
jt—joint
junct—junction

K

kc—kilocycles
kg—kilograms
kn—knife
KSw—knife switch
KV—kilovolts
KVA—kilovolt-amperes
KW—kilowatts
KWH—kilowatt hours

L

L&B—lock nuts & bushings
LA—lightning arrester
lac—lacco
lb—pound
LC—lead covered
Lex—Lexington
lf—left
lg—long
L.H—left hand
lim—limit
lin—lineal
liq—liquid
lp—lamp
Ls—elbows
LT—low tension
lt—light
ltg—lighting

M

mach—machine
magSw—magnetic switch
magz—magazine
max—maximum
MCM—thousand circular
mills
mech—mechanical or
mechanism
med—medium
memo—memorandum
met—metal
Metro—Metropolitan
mfr—manufacturer
MFu—main fuses
MFSw—main fused switch
MG—motor-generator
Mh—manhole
mid—middle
min—minute
misc—miscellaneous
mk—make
MLug—main lugs
mn—main
MO—motor operated
mot—motor
MSw—main switch
mtg—mounting
mtl—material
mtr—meter
mtrg—metering

N

neg—negative
N-E-P—National Electric
Products
NEC—National Electric
Code

Nwk—network

#—number

O

OC—over-current
OCB—oil circuit breaker
oct—octagonal
OD—outside diameter
OL—overload
opng—opening
opp—opposite
orig—original
opr—operating
oz—ounce
OZ—O Z Co

P

P-S—Pass & Seymour
Ø—phase
par—paragraph
part—partition
pb—push button
PB—pull box
PC—pull chain
pent—penthouse
PFM—power factor meter
pg—page
PH—pot-head
PI—paper insulated
pl—plate
pnl—panel
pntg—painting
pos—positive
pp—pages
pr—pair
pri—primary
prov—provide
pot—potential
pt—point
PT—potential transformer
pwr—power
PyPh—polyphase

Q

qik—quick
qt—quart

R

R-S—Russell & Stoll
rad—radius
RC—rubber insulated
RC—remote control
R-C-A—Radio Corp of
America

rd—round
rec—receptacle
rect—rectifier
refl—reflector
reg—regular or regulator
reinf—reinforced
req—required
rev—revolutions
res—resistor
rep—representative
RFu—rear fused
rheo—rheostat
RH—right hand
rpm—revolutions per minute
rt—right
rvsg—reversing
ry—railway

S

S-P—Stanley & Patterson
SB—single braid
sec—second or secondary
sect—section
sep—separate
ser—service
sfy—safety
sh—shunt
shd—shade
sher—sheradized
sht—sheet
sing—single
sl—slate
SN—solid neutral
sok—socket

sol

Sol—solenoid
SP—single pole
spec—specifications
SpGr—specific gravity
spkr—speaker
spl—special
sq—square
SqD—Square D
std—standard
stl—steel
str—starter
strd—stranded
sty—story
subst—substitute
sup—support
surf—surface
sw—switch
swbd—switchboard
SwgBkt—swinging bracket
swgr—switchgear
syn—synchronous
syst—system

T

TA—tank alarm
TB—triple braid
tel—telephone or telegraph
temp—temporary or tem-
perature
term—terminal
terz—terrazo
tex—texrope
TP—three pole
3P—three pole
trans—transformer
trf—transfer
typ—typical

U

UH—unit heater
ult—ultimate
undg—underground
unf—unfused
United—U E L & P Co
UV—undervoltage

V

V—volts
VA—voltamperes
vac—vacuum
var—variable
VC—varnished cambric
VM—volt meter
vol—volume
volt—voltage
vs—versus

W

W—watts
w—wire
wd—wide
W-E—Western Electric
Wemco—Westinghouse
wh—white
WHM—watt hour meter
WM—watt meter
wrg—wiring
wt—weight

Y

yd—yard
yr—year

CODIFICATION OF SPECIAL RULES

A committee of the Michigan Association of Electrical Inspectors is attempting to codify the special rules in the state of Michigan in order to present a uniform set of rules throughout the state. This article is an abstract of the paper presented before the Association in December by Mr. Morton.

BY H. J. MORTON
ELECTRICAL SUPERINTENDENT
CITY OF PONTIAC, MICH.

fallacy to believe that there are ten different and equally good ways of doing the same job, or accomplishing the same purpose.

In the City of Pontiac, with an area of 20 square miles, about 9 square miles are served by one utility company and the other 11 square miles are served by a second company. In conducting our municipal inspection work, we are daily faced with some rather amusing problems, due to the fact that the two utility companies in their established rules and regulations for service entrance requirements have entirely different practices. They both could change their ways and yet have the installation perfectly safe, perfectly adequate, and a lot more economical to the public.

Municipal inspectors should realize more than ever the important part which they are called upon to play in their own communities. The municipal inspector or the city electrician is considered, or at least should be, by the people at large as the one individual who is being paid by them to protect and insure that they have proper electrical wiring installations. Upon this inspector falls a great responsibility which he should not abuse and considerable care should be exercised by them in making additional rules and regulations not to penalize any class of home owners or business concerns or cause undue construction expenses.

With business conditions as they are today, restrictions of all kinds are being readjusted to fit into the picture in better shape. Therefore, if some individual inspector has decided in his own mind that a larger entrance switch is necessary for all classes of work falling in a certain category, he must have the facts to prove that switches of the present required capacity are proving inadequate and consequently a serious hazard.

However, if a uniform set of rules can be arrived at and one man's pet idea is not indorsed by the organization, this particular individual should be convinced that he may be a little over-anxious to promote something which is not feasible at this time.

THE territory in the State of Michigan represented by this membership of the Michigan Association of Electrical Inspectors covers nearly 500 cities, villages, and towns in which the two large utility companies, The Detroit Edison Company and the Consumers Power Company, are operating. Recently I have undertaken to procure copies of existing special rules and regulations which are being enforced throughout this territory. Much to my surprise I find that there are in excess of 1,000 rules of a so-called special nature, some of which are more or less the same in the various communities and some of which are widely varied.

These so-called special rules are in the large majority of cases in addition to the National Electrical Code, covering features of construction and wiring practice and advanced use of new devices and appliances as brought into the picture on account of certain constructional demands which are not covered in the Code and which, due to the necessarily slow procedure to have each rule included in the revised codes, are put into effect as soon as possible by the local authorities to take care of existing construction conditions.

Amusing things appear in going over the various sets of special rules. For instance, requirements for a 30 amp. residential service vary from two No. 12 rubber-covered wires in $\frac{1}{2}$ in. pipe to three No. 8 rubber-covered wires in $1\frac{1}{4}$ in. pipe. Grounding is accomplished in a multitude of different ways and the rules have all been made with good intentions; but it is a

55% less overhead

"IT IS ONLY WHEN SAVING BECOMES A NECESSITY INSTEAD OF A MERE VIRTUE THAT WE REALLY BEGIN TO STUDY OUR BUSINESS," SAYS E. L. KNIGHT.

AS TOLD TO HENRY W. YOUNG
BY E. L. KNIGHT.

ASCERTAINING that the E. L. Knight Electric Co., of Portland, Ore., had made a little profit out of the electrical contracting business in 1931, it seemed logical that the readers of this magazine might wish to know how he did it. Such a condition of affairs during the past year would appear to fall in the same category as the dog biting the man—News. Interviewing Mr. Knight on this subject, he made a number of statements which are well worth recording before setting forth the figures themselves.

"When you wish to learn how a machine tool is operating," he said, "go and examine the metal turnings—the waste. It tells you a definite story of either efficiency or deficiency. In the same way, when looking into the efficiency of operation of your business, best start at once pawing over the overhead. Overhead is the waste pile, or turnings. Some of it is necessary in every business, but, oh! what a story it tells when one begins to dig into it in earnest."

"I am not ashamed to say that before this business crisis hit us, I did not realize what my overhead was doing to me. I knew what it was in percentage. I felt that it was too high, probably, and let it go at that. That was in the happy times when Saving was a Virtue only. It was when Savings became a Necessity that I was compelled to learn about my business things that I had never realized before. I found, for instance, that my overhead was absurd in view of present conditions. Early in 1931 I took the axe in hand, with the result that I lopped off just 30% of it. I still have the axe going and the limbs are still falling.

"Perhaps it is too early to say so with assurance, but I have the feeling, which is steadily growing, that the depression of 1931 is going to be a blessing in disguise to me, taken over a period of years from now on. For ten years I had been throwing money into the overhead waste pile that might have been saved. I might have made real profits instead of just satisfactory profits. I have learned my lesson. From now on I am going to watch the operation of my business machine just as closely in fat years as in lean years, and with the revival of business in general expect to make back what the depression has lost me and then some."

In trimming his overhead, Mr. Knight did not go about it in the usual way—get in a panic, fire half the force, send someone around every five minutes to turn off lights and so on. In fact, with one or two exceptions, no one has been let go, and the salary cuts that all have taken have not been great. He made the very remarkable savings mostly in three major directions, on top of which were the usual parings that could be made in small ways.

The first and most important saving was made by a radical change in the business itself and the location of it. For many years past he had conducted a retail electrical appliance and fixture business along with the contracting business. The location of the store and office had been in a fairly expensive retail district. He had known for a considerable time that this retail business did not make money. If it carried itself, conditions had to be fortunate. Furthermore, it took much of his time in general supervision, and added immeasurably to his worries. It took Necessity, however, to force the issue, and bring about the decision to get rid of it. This was done in the Spring of 1931 and the contracting business moved over into

the cheaper wholesale district.

In the new location, some 12,000 sq. ft. were obtained, as against 6,000 sq. ft. in the old place. Taking into consideration light and power as part of rent, the total saving in rent alone in the new place was 26 per cent in 1931 as against 1930. From the purely contracting standpoint, the new location is admirably suited to their purpose. For one thing, they now have 80 per cent natural light in the offices as against all artificial light before. A considerable stock of fixtures is maintained, in fact the largest stock of fixtures and glassware maintained by any contractor in Portland at the present time. There are three artistically arranged show rooms and one long hallway, the latter devoted to the larger glassware. No appliances are handled here.

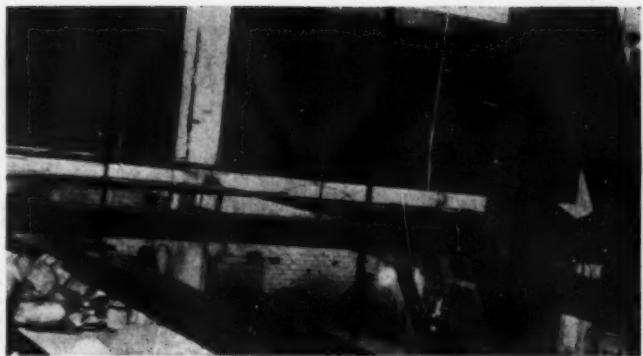
The second major saving was made in the direction of automobile and truck operation and maintenance. The company owned four automobiles, including Mr.



E. L. KNIGHT

Knight's, and one truck. All the expenses of these cars were paid by the company. The men who used the cars, used them as their own. There were also two men owning their own cars and using them in the business. The upkeep on these was also all shouldered by the company. Early in his investigations, Mr. Knight began to study this automobile situation, with the result that about 10 per cent of the automobile cost was pared off in 1931 in lesser ways, in itself showing a considerable monthly saving. It was just enough to get him interested in going to the very bottom of the matter and resulted in another very radical step which has been taken since the first of the year.

Now, the company no longer owns three of the automobiles. They have been sold to the men operating them. The sales prices were nominal, but the main thing is that the company is out from under, so to speak. Whereas, it had formerly kept up all the various kinds of insurance, made the repairs, set aside a sum for depreciation, etc., now there is none of this except a single employers' liability policy for the lot, carried by the company at small cost. One of the four cars, which was well past its usefulness, did not enter into this arrangement.



VIEW FROM BALCONY
SHOWING PORTION OF STOCK ROOM

In the case of the truck, it was decided the first of this year to dispense with it altogether for the present, and it is laid up. In so far as practicable, every man from Mr. Knight down, now co-operates in making deliveries of materials and supplies to the job, and it is surprising how much of it they are doing. Loads that cannot be delivered by automobile are being handled by an outside trucking company.

Using 1930 figures as a basis of comparison, and after applying a generous estimate of the hired trucking that will be necessary, Mr. Knight figures that this year the saving in automobile and truck expense will be 60 per cent over 1930. What expense there will be is represented by the hired trucking and the operation expense on the automobiles, for gas, oil, etc., which latter will be arranged for with the men on a fair basis.

There is also another saving associated with this; namely, the wages of a truck driver, of \$135 a month.

Finally, general overhead was reduced by a judicious shifting of employees, so that all might hold some kind of a position, though at less money, and not be let out altogether. One or two examples of shifting will serve to illustrate the point. It was found that there was one more regular wireman than they needed for the work then in hand. So one of the regular wiremen was taken off that work and put on the truck to make deliveries and also take care of the stockroom, which he was willing to do at the truckman's wages. This made it necessary to let the former truck man go, the only case that year when a man was let off.

This worked out very well until it was decided to lay up the truck. Then another shift had to be made. Fortunately there had been considerable new work started since January 1 so that this truckman-stockkeeper could be transferred back to his regular wiring work. This left the stockroom without a head, so to the wiring foreman was assigned the duty of looking after stock along with his other work.

General overhead was reduced in 1931 30 per cent as mentioned, by moving, shifting men, saving on automobile cost, saving about 40 per cent on expense accounts and in sundry other minor ways. Now, with the still further reduction in automobile expense, laying up the truck and eliminating the chauffeur it is confidently expected that overhead for 1932 will show a reduction of 55 per cent to 60 per cent over 1930.

"And believe me," says Mr. Knight, "it is going to stay down."



GENERAL TREATMENT OF
FIXTURE DISPLAY ROOMS IN NEW LOCATION

beating the depression

300 short center drives in one year

Less than a year ago B. Y. and J. F. Ferrari, proprietors of the Excel Electric Co., Chicago, sent out the following letter to 250 prospects:

"We have had the privilege of serving you in connection with your electrical problems. We feel that the responsibility to our customers does not lie alone in the satisfactory service, but also in keeping them advised of new developments in electric power applications as they come to our attention.

"With this in mind, having thoroughly convinced ourselves that the floating motor drive is a marked improvement in motor installations, we respectfully submit for your consideration the enclosed circular.

"Our engineers have the facilities to properly demonstrate this device in your office, requiring but a few minutes of your time, and we trust you will be sufficiently interested to allow our representative to make demonstration."

sells amplifiers

R. A. Schaeffer of the Universal Lighting Fixture Co., Reading, Pa., sees a future in the use of amplifiers for schools, public halls, etc. When each class room in a school is equipped with an amplifier, he points out, the principal may make announcements instantly throughout the school. The amplifier may also be used for announcing fire drills or fires.



sells entrance lights



M. L. Spain of the Bryant Electric Co., Atlanta, urges customers to have entrance lights installed as shown in the photo. These are especially designed for apartment houses and driveways. In addition to their ornamental value they make the residences of doctors, funeral homes, etc., stand out and so are a dignified advertising medium. With construction work at low ebb this firm is making special effort to sell lights, exhaust fans, etc.



A DEMONSTRATOR SHOWS THE ACTUAL OPERATION OF THE FLOATING MOTOR RIGHT ON THE PROSPECT'S DESK.

The reaction was favorable and they went into this specialty deeper and deeper with the result that they have sold about 300 installations, part of these being "V" belt and sheave units.

Each of the brothers has his own list of customers and prospects and they have another salesman in addition. They solicit this work wherever they see any possible need. In addition to making direct solicitations on the motor bases only, they get many leads while soliciting motor repairs, which is the main specialty in their business. For instance, if the industrial man says he needs no repair work the subject of short center drive is brought up and often results in an order. This company's idea is "everybody has a motor" and wherever there are motors the salesmen look around for a loose belt, or a needed change which will afford an opportunity for a sale.

Outside of the letter they have found no need for additional advertising and have secured all the other business by personal calls. They state unhesitatingly that there is a great opportunity for the electrical contractor along this line as the installations are easy and economical.

refrigerator wiring

Bob Pow of the Euclid-Taylor Electric Co., Cleveland, Ohio, is going after the refrigeration business this year in order to secure more business. A short time ago a representative of one of the large refrigeration manufacturers came into his store to purchase some wiring material. Mr. Pow convinced the representative that his workmen could do this work very satisfactorily and got the contract. A little later a second manufacturer was signed on their installation work. This work while not heavy at present is expected to provide a considerable volume of wiring as warm weather advances.

Electrical Contracting, March, 1932

a search for the truth on merchandising

A special committee of the Association of Electragists, under the chairmanship of Robert J. Nickles, is making a survey of local electrical merchandising conditions.

The purpose of the survey is to find out, first, the place now occupied by the contractor-dealer in the merchandising market; second, the competitive conditions under which he must operate, and third, the extent to which the local contractor-dealers and utilities have tried to work out their problems through cooperative plans.

The questions being asked in the merchandising survey will be found in the next column. Mr. Nickles has written to say that his committee would like to hear from as many contractor-dealers as possible, whether they are members of the Association of Electragists or not. All communications should be sent to Mr. Nickles at 109 West Main Street, Madison, Wisconsin.

How many stores are operated by electrical contractor dealers in your city?

Of these stores, how many are equipped to offer a first-class merchandising service?

Do these stores feature only nationally advertised appliances?

How many electrical contractor dealers in your city have discontinued merchandising departments during the last five years?

In your judgment, what percentage of the total sales of electrical merchandise in your city are made by:

The electrical contractor dealer? Local public utility?

Chain stores? Department stores? All other outlets?

Does your local utility sell electrical appliances?

If so; do you feel that their withdrawal from the merchandising field would help your business?

Does your local utility sell only standard, nationally advertised appliances?

Do any chain stores sell standard appliances?

If so, what percentage are standard?

Does your local utility maintain standard resale prices? Offer premiums? Feature trade-in allowances? Or employ highly competitive tactics in an effort to sell

in competition with the electrical contractor dealer?

Does your local utility have any dealer cooperative plan for stimulating the sale of appliances by dealers? Or assist the dealer in financing time payment sales? Or consign merchandise to the dealer for display on the sales floor of the dealer? Or advertise in cooperation with the electrical contractor dealer?

Does your utility do any interior electrical construction work?

If so; is it in competition with the electrical contractor dealer?

Does the utility maintain a free appliance repair department?

Does the utility cooperate with the electrical contractor dealer in determining a fair price schedule for connecting electric ranges?

If so; what price have you agreed upon as being a fair average?

How often do the electrical contractor dealers in your city meet with representatives of the utility?

Does your local utility pay the electrical contractor dealer a commission on any sales made by the electrical contractor dealer?

Does your local utility extend extravagant time payment sales? (State terms)

How many nationally operated chain stores are there in your city?

To what extent have they effected your merchandising business?

Do your local chain stores maintain standard resale prices?

Do your local chain stores indulge in unethical advertising such as offering extravagant premiums in connection with the sale of electrical merchandise? (Send samples of advertising)

Do your local chain stores maintain any type of servicing department? If so; to what extent?

Have you a local ordinance which prohibits the sale of sub-standard electrical materials or appliances? If so; is it enforced?

Would such an ordinance, in your judgment be helpful to the electrical contractor dealer in your city?

Has there been any evidence of the increase of the sale of wiring materials by the department or chain stores in your city?

Are the home-owned department stores in your city ethical and fair in their competition, and do they maintain prices on appliances?

Do the chain stores, department stores or hardware stores in your city extend extravagant time payment sales?

Do your local chain stores or hardware stores conduct sales featuring cut prices?

Do the department stores, or other non-electrical stores in your city, have outside salesmen selling electrical merchandise?

Do the contractor dealers in your city advertise aggressively?

To what extent have the furniture stores in your city engaged in the sale of electrical appliances?

To what extent do you think the present economic situation has affected the sale of electrical merchandise during the last 18 months? This applies to all types of stores.

Has your local utility recently shown a keener desire to get together with the local electrical contractors, than was the case in the past?

How recently have you met with utility representatives?

Have the electrical contractor dealers in your city ever submitted a written schedule of cooperative plans to the utility officials?

If so, have they met with you to discuss your requests?

What was the result of the meeting?

electrical contracting

With which is incorporated The Electragist

S. B. WILLIAMS, Editor

BOOTLEGGING

OUT of almost one hundred candidates for an electrical contractors' license in the recent Milwaukee examination, but three passed. The questions were not tricky, or extra difficult. The board tried to make the test a fair one based on sound practice.

If under these conditions only 3 percent passed, then it would appear that the legitimate electrical contractors are faced with another serious menace—competition from hundreds of wiremen who want work. These men are not competent to take work on their own responsibility as shown by this test.

With many cities finding it necessary to cut the budget, the electrical inspection forces are feeling the knife. The police protection is, therefore, poor and the chance of "getting away" with this "bootleg" wiring is getting greater. Where do these bootleggers get their material? Is that not a question for the legitimate trade to ask?

Where there is a license law the contractors should insist upon its enforcement and the meeting out of the prescribed punishment. There is no other effective deterrent.

The legitimate wholesalers ought to see that material sold to this class of trade hurts their good trade. They should have a "wholesale only" policy and confine their sales to licensed contractors.

There is nothing to be done with the so called "gyp" wholesaler except to withhold patronage. As a rule this kind of a wholesaler does not get very far with that loose kind of method.

The legitimate trade, however, must do everything it can to secure convictions and to urge their wholesalers to play ball with them.

THE RANGE CAMPAIGN

THE nation-wide three-year electric range promotional campaign is getting under way. Will it go over with the support of the industry or in spite of it?

The manufacturers of gas ranges have decided to meet the challenge and go to the public with a gas range campaign. What are the utilities going to do—particularly those with combination gas and electricity interests?

In the past such companies have been content to let gas get the market. Are they going to throw their weight with gas now, or are they going to be neutral?

If the gas interests decide to fight for the market, then we can be sure that the matter of first price will be a factor. This includes price of range and price of wiring.

The manufacturers undoubtedly are studying the price of the range, and will solve this problem either by reducing the price or by making an article with so many selling points not available with a gas range, as to justify the price.

With wiring it will be possible to effect a saving provided two or three contractors are given all the business and provided a standard hook-up is worked out which is safe and sane.

We are firm believers in safety, but we believe in protecting primarily the home owner rather than the utility. There is no occasion to depart from the Code to get a safe and sane job.

Finally, if the range is to go over nationally there must be low rates. If it is fair for the utilities to urge lower wiring costs on the contractor in order to get ranges in the lines, then it is equally right for the contractor to urge lower rates for cooking so that he may get more range wiring.

Everybody has something to gain in the promotion of the electric range—provided we do not make it too easy for the gas interests to compete.

THE PRODIGAL MARKET

WHAT has been characterized as the first major improvement in bells and buzzers is the new flush line of low tension devices for the home which has just come on the market.

The electrical contractor should welcome this development for three reasons: First, this new line gives him for the first time a real merchandising opportunity with this type of equipment. There have been many

attempts to improve the appearance of bells and buzzers, but after all they stood out on the wall and in order to make them less of an eye sore the painter generally gave them a coat of paint.

Secondly, the design of this new line, requires a good wiring job. With the transformer in the cellar, the most inexpensive bell cord was run up the partition to the bell and the job generally was given very little attention. This has resulted in considerable costly service work on the part of the contractor. With the new system the transformer is in the kitchen behind the same grill as the bells and buzzers. Therefore, the important wiring is 110 volts and has to be good.

Thirdly, this new line should bring much of the bell and buzzer business back to the contractor. Of late, this type of material has been getting cheaper and cheaper and gradually going the way of all price material—to the chain and hardware store. As such, neither the manufacturer or the contractor made any money on it.

The new line is not an over-the-counter proposition, it is distinctly an item for the contractor. With him as the principal outlet, everybody in the industry can make money. We welcome the return of this fine market—the contractor's original market—to the electrical contractor.

FIRE LOSSES

"THE records of proven electrical fires compiled by the Electrical Bureau of the New York Board of Fire Underwriters, show that the losses for uninspected and unapproved electrical devices and materials is 81%, of the total proven electrical losses."—J. C. Forsyth, Chief of the New York Underwriters Electrical Inspection Department.

In Chicago, according to W. A. Jackson, city commissioner of gas and electricity, out of the 650 electrical fires in 1931, 400 occurred in residences and three-fourths of them were due to faulty installation of electrical equipment by home owners.

In the face of such facts how can any city hesitate to require regular reinspection?

Not only is there a dangerous condition arising out of the lack of reinspection but a serious competition is being built up for the electrical contractor. When the contractors pay the city a license to permit them to engage in wiring, the city assumes an obligation to see that they get the wiring work in that city. The license laws say that it shall be unlawful for anyone to do wiring without a license.

Reinspection is necessary if this law is to be enforced.

THE WAGE QUESTION

ONE of the most perplexing problems in the deflation process has been that of wages of organized labor. Almost without exception unorganized labor has taken one or more cuts in the basic wage but the unionized men have been operating under contracts which still have many months, and some of them years, to run.

In some industries lower wages may permit the operators to keep the plant running and in some cases bring an increased production and more employment. In the field of electrical construction there is another problem to face. Already the men have taken a tremendous cut in income due to unemployment and they see a cut in wages as merely another loss of income without any compensating advantages.

It is a difficult matter for the employers to face, because they know that a lower hourly wage will have little effect upon employment. The bankers have been crying most loudly for lower labor charges in building, but they have not indicated that they will release any money for financing constructions when labor does reduce its wages.

Labor knows this and in most instances has refused to take a cut like everybody else, because there was nothing to bargain for. One cannot help sympathizing with building construction labor in this crisis but this is not like previous deliberations on contracts. This is nothing to bargain for.

We believe that the electrical contractors are charged with the responsibility of trying to improve the employment condition of their men by improved selling methods, but this is nothing to bargain over.

If wages are not reduced it is likely that even the little work now enjoyed may be cut off. The public believes that building mechanics took advantage of every opportunity to secure higher wages during boom times and that the maintenance of those wages today is sheer robbery.

Is labor a part of the building construction industry? The time to make answer is now. If labor has an interest in the industry then it will take a lower wage. The public good will of the building industry is today in the balance. Materials are down, but labor is up. A voluntary reduction of wages will help to hasten the day of renewed construction activity. A refusal to lower the hourly wage, no matter what the argument, is bound to have the effect of prolonging reduced construction activity.

\\ \\ code chats // /

A MONTHLY DISCUSSION OF WIRING PRACTICE AND QUESTIONS OF INTERPRETATION, PRESENTED WITH A VIEW TOWARD ENCOURAGING A BETTER UNDERSTANDING OF THE NATIONAL ELECTRICAL CODE.

CONDUCTED BY F. N. M. SQUIRES

ASSISTANT CHIEF INSPECTOR, N. Y. BOARD OF FIRE UNDERWRITERS

POWER WIRING CALCULATIONS

A question has come up in this office as to the intent and application of Article 808 (a) 3 on Page 115 of the 1931 Code, which reads, "when the load consists of two motors of the same horsepower rating, that is, more than 40 per cent of the total horsepower load, the 125 per cent value shall be required for only one of these motors."

Please explain this and give a problem illustrating its application.

Sub-paragraph 3 is really a part of sub-paragraph 2. Here the "group" of motors may be just the two motors of equal horsepower in which case neither is the "largest" but either one is "over 40%" of the total as it is actually 50% of the total. In such a case the feeder would have to have a carrying capacity not less than 125% of the full load rating of one motor plus the full load rating of the other. In other words 225% of the rating of each or either motor.

Or the "group" might be more than two motors, but such groups will be infrequent. For instance we might have two 45 hp. and two 5 hp. motors. In such a case the feeder would have to have a carrying capacity not less than 125% of full load rating of one 45 hp. motor plus the full load rating of the other 45 hp. motor plus the full load rating of the two 5 hp. motors.

For example assume the above to be 230-volt d.c. motors. From Table 2.

Full load 45 h.p. = 163 Amps.

Full load 5 h. p. = 19.8 Amps.

To find the size of the feeder for this group we take

125% of 163 Amps. = 204 Amps.
plus 163 = 163
plus $2 \times 19.8 = 39.6$

406.6 Amps.

From Table 1 of 612 we find this calls for 500,000 C.M.R.C. wire.

20

To find the size fuse or rating of circuit breaker we refer to 808 (a) 2 and in Table 6 find the percentage of 150 for fuses and time limit circuit breakers and the percentage of 250 for instantaneous circuit breakers.

The fuse or time limit breaker is to be of 450 Amps.

The instantaneous breaker is to be
150% of 163 Amps. = 244 Amps.
plus 163 = 163
plus $2 \times 19.8 = 39.6$

446.6 Amps.

The fuse or time limit breaker is to be of 450 Amps.

The instantaneous breaker is to be
250% of 163 Amps. = 407 Amps.
plus 163 = 163
plus $2 \times 19.8 = 39.6$ Amps.

609.6 Amps.

so that the breaker should not be set at over 610 Amps.

MOTOR DISCONNECTS

1.—Does the National Electrical Code demand that a disconnect switch be provided for all motors?

In general, yes; but this needs just a little clarification for he mentions disconnecting switch.

Rule 1003 (b) says that each motor with its controller shall be provided with a separate disconnecting means except as provided in this section.

Note that the rule requires a disconnecting "means." This may be a switch or in certain instances may be a plug connector or plug fuses. Where the connected load (the motor or group of motors) is 50 H.P. or less, the disconnecting means shall be a motor circuit switch, and shall be the same type of switch for larger loads when the controller does not open all the ungrounded main conductors to a motor.

For loads larger than 50 H.P. where the controller opens all ungrounded main conductors and all auxiliary circuits the disconnecting means may be a general fuse or an isolating switch instead of a motor circuit switch.

For a portable motor a plug connector may be used as the disconnecting means. For a small motor, but only where permitted by the inspection department having jurisdiction, the disconnecting means may be plug fuses.

But nowhere do we find permission for the elimination of the disconnection means altogether. Now again referring to rule 1003 (b) we note that a separate disconnecting means is required for each motor except that in the following cases a single disconnecting means may serve a group of motors:

1. Where two or more motors are

Electrical Contracting, March, 1932



DISCUSS CODE CHANGES:—M. M. Peck (right), inspector at Kingston, N. Y., discussing code changes with Joseph Grubert (left), and Herbert Myers, contractors. In this section of the country the inspectors are employed by the underwriters, but are authorized as official city inspectors.



What About the Fuses You Sell?

YOU KNOW, that today, customers are demanding lower cost of production and more efficient operation. Right here is where the BUSS SUPER-LAG Fuse can help you build good will and make a profit. This new fuse fills a long felt need for a fuse that would blow safely to protect equipment yet would have a time-lag long enough to hold many of the harmless or temporary overloads that occur in all electrical circuits.

What fuse user will not be glad to have you show him how he can reduce costly and needless shutdowns; prevent machines from stalling and workers standing idle; keep lights glowing and production at peak? Surely every fuse user will be glad to learn of this new fuse.

Why not spring this real sales story on your trade? IT WILL GIVE YOU AN ANSWER TO THE MAN WHO SAYS "MAINTENANCE COSTS ARE TOO HIGH."

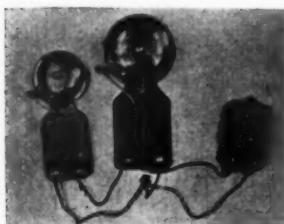
Send for complete information gotten up in handy booklet form—or if you prefer we will be glad to have a representative call and show you how to make profits and build good will with BUSS SUPER-LAG Renewable FUSES.

BUSSMANN MANUFACTURING COMPANY, ST. LOUIS, MO.
A Division of the McGraw Electric Company



Cut-away view of a 60 ampere 250 volt BUSS SUPER-LAG Renewable Fuse. Note the lag-plates on the link. They're what makes the difference.

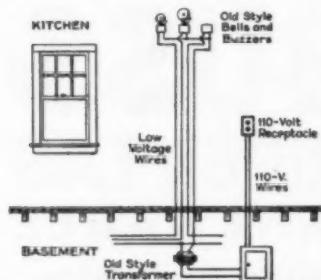
**BUSS
SUPER-LAG
RENEWABLE
FUSES**



The OLD-FASHIONED Way

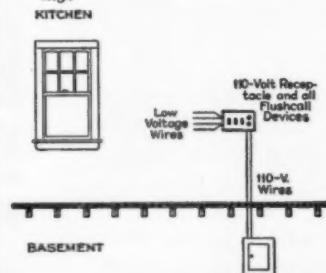
for residences

THREE JOBS — hanging bells and buzzers high on kitchen wall—installing 110 volt outlet low on kitchen wall—putting old-fashioned bell-ringer in basement. Costly time, needless labor and excess wiring. In apartments long feed wires throughout the building make the job even worse.



The FLUSHCALL Plan for residences

ONE JOB—110 volt outlet combined with POWACALL and other FLUSHCALL devices in one standard box low on kitchen wall. You save time, save labor and save wiring. In apartments the POWACALL in each suite eliminates old-fashioned transformer in basement and long feed wires running throughout entire building.



Here at last—a complete line of flush, concealed calling and signaling devices for residence, apartment or any place where you've heretofore used old-fashioned bells, buzzers, pushes, bell-ringers or annunciators.

Purchase cost the same—installation cost less.

They fit standard boxes and take standard plates. They can be ganged together just like switches or receptacles.

Two years of painstaking experiment have perfected these compact 8 to 12 volt A.C. devices—requiring no adjustment before, during, or ever after installation and the perfect power supply unit to operate them all.

The complete line meets every condition with easier installation, better tone, lasting efficiency and far better appearance.

The FLUSHCALL Plan

A new simplified wiring plan too—taking three different jobs at three separate locations and combining them into one easy job at one location. It combines the 110 volt outlet with the Powacall and other Flushcall devices in one standard box—finished with a standard plate—fully within code requirements—less time, less labor, less wiring.

With this new line the call system comes back to the fold of the electricians for an efficient, safe, approved wiring job. Your supplier has the Flushcall Line in stock now and full information. A complete descriptive booklet has been sent to you. If you haven't received it, write us for Bulletin F. L. I.

EDWARDS & COMPANY Signaling Specialists

THE FLUSHCALL LINE IS HERE

The BUZACALL



that replaces the old-fashioned buzzer with far better tone and much more carrying power.

Catalog No. 661

The RINGCALL



that replaces the old-fashioned small bell with better tone and more carrying power.

Catalog No. 660

The MELOCALL



that replaces the old-fashioned dining room-kitchen call device. It gives a soft, mellow, momentary "ding"—an entirely different "third call."

Catalog No. 663

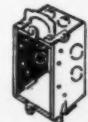
The TUCALL



that replaces the old-fashioned combination bell and buzzer with both calls far superior in tone and carrying power.

Catalog No. 662

... fit Standard Boxes
... take Standard Plates



The TOHELPUSH



an efficient push—fits any standard box and takes any standard switch or telephone plate.

Catalog No. 664

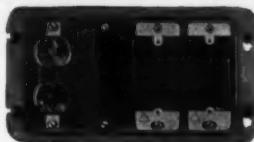
The POWACALL



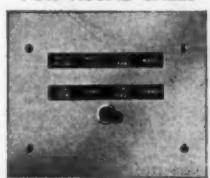
that replaces the old-fashioned transformer. Underwriters approved. Fits any standard outlet box with raised cover giving 2 3/8" depth—110V, 60 cycles primary—8V secondary, binding post for both.

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Can be ganged together and lined up with 110V. devices



The ANNUNCINETTE FOR VISUAL CALLS



a small, neat, flush, standard unit that replaces the old-fashioned surface annunciator at no greater cost.

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For over
Sixty years

140 and Exterior Streets, NEW YORK

ALL OF THESE 7 FEATURES AT NO EXTRA COST GIVEN TO YOU IN THE ELECTRICIANS SPECIAL HACK SAW BLADE

1. Fine teeth on forward end of blade start the cut on the first stroke.
2. Regular pitch teeth lead into the cut smoothly.
3. Broken or ripped out teeth eliminated.
4. Easy starting teeth induce the use of full length of blade.
5. Small angles, etc., may be cut at ANY ANGLE.
6. Cut started exactly on mark desired.
7. Temper, hardness, and perfectly set teeth guarantee longer service.

A blade designed especially for cutting BX, Conduit, Wire Mold, Angles, etc. 18/36 and 24/36 Pitch combination.



Ask your electrical wholesaler or write

**THE HENRY G. THOMPSON
& SON CO.**

Est. 1876

New Haven, Conn.

grouped on a single machine or piece of apparatus to drive its separate parts.

2. Where two or more motors are grouped under the protection of a single set of fuses or a circuit breaker (as allowed in section 808).

3. Where two or more motors are located in a single room with all of the motors within sight of the disconnecting means.

4. Where each of a group of motors is controlled by a knife or snap switch alone.

2.—Would a magnetic contactor (installed without a disconnect switch) disconnecting all ungrounded wires be the equivalent of a disconnect switch?

A magnetic contactor if used as a motor controller could not be used as both the controller and the disconnecting means for in rule 1003 (b) is the requirement that each motor with its controller be provided with a disconnecting means. This means that there must be a disconnecting means which will disconnect both the controller and its motor.

A motor circuit switch, or a general use switch, or an isolating switch could, of course, be operated magnetically and if in accordance with the definitions in Article I for switches of these types and if of the plainly indicating type could be used as the disconnecting means. See also answer to question No. 3 following.

3.—From a safety standpoint how can the above mentioned contactor be disconnected to insure absolute safety to a person working on the motor?

Rule 1003 (d) requires that the

disconnecting means be within sight of the motor controller unless the former is arranged so that it may be locked in the open position.

If the disconnecting means is of a magnetic switch type it should be so arranged that the "off" or stop button or control may be locked so that the motor cannot be started as long as this is locked.

4.—Are across-the-line starters permitted to be installed without disconnect switches?

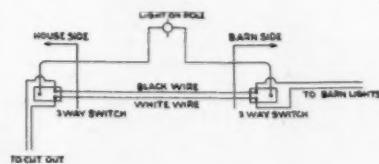
No. A disconnecting means in addition to the starter, which is the motor controller, should be provided.

If the across-the-line starter is in the form of a knife or snap switch the disconnecting means could be a feeder switch if in conformity with rule 1003 (c) and if the feeder switch was capable of being locked in the off position.

THREE WAY SWITCH CONNECTIONS

It is quite often desired in the wiring of farm buildings to have an outside light between the house and barn on a pole about half way. Is it allowable, as far as the Code is concerned, to put this light on three way switches in the following manner to save copper and labor?

Provided the lights in the barn and the one on the pole are on but one branch circuit, and provided that



there is a switch in the house which will entirely disconnect this circuit (including the light on the pole), and provided that the wires between the house and the barn are not enclosed in magnetic metal (unless all three wires are within the same armor), the arrangement referred to does not violate the Code.

If the two circuit wires running between the house and barn are run in conduit, or are metallic clad cable, and the wires to the pole light are not run within the same armor there would be a violation of the Code. However, the induction caused by the current from a single lamp would probably be insufficient to present a fire hazard, especially as practically all of the wires are out of doors.



BIG JOB DONE IN A HURRY:—S. J. Stewart, New Orleans motor specialist, thinks nothing of a job of this size and is in his element when the work has to be finished in record time. This 400 Hp, 2300 volt, 3-phase, 60 cycle, 544 rpm stator was brought into his shop and completely rewound, including the making of the coils, in sixty hours.

The RALCO Line

BULLETIN 120

**EXPLOSION RESISTING
GASOLINE PUMP JUNCTION BOXES**

The Junction Boxes illustrated in this Bulletin were designed in accordance with the Underwriters' requirements for Class 1, Group G locations, with especial reference to Gasoline Dispensing Pump installations.

These boxes are threaded with standard tapered conduit threads, as are the Unions and Plugs listed below.

Boxes are threaded for conduit opening as shown, and will be found practical, convenient and economical.

The combination of these Boxes, Unions and Plugs will allow you to meet any condition to be found on new installations, or in bringing up old installations to Code requirements.

Boxes may be assorted to make a standard package. Unions and reducing union ends may be assorted (in full cartons) to make a standard package. Plugs may be assorted (in full cartons) to make a standard package.

SCHEDULE "E"		XPU	XPG	XP4	XP3
Outside Dimensions		4 $\frac{5}{8}$ " x 4 $\frac{5}{8}$ " x 2 $\frac{5}{8}$ "	4" x 4" x 2 $\frac{3}{8}$ "	4" x 4" x 2 $\frac{3}{8}$ "	3 $\frac{1}{4}$ " x 3 $\frac{1}{4}$ " x 2 $\frac{3}{8}$ "
Number of Openings	10	5	5	5	5
Size of Conduit	3/4"	3/4"	3/4"	3/4"	1/2"
Location of Openings	4 Back 2 Bottom 2 top 1 right 1 left	2 Bottom 1 top 1 right 1 left	1 Back 1 Bottom 1 top 1 right 1 left	1 Back 1 Bottom 1 top 1 right 1 left	1 Back 1 Bottom 1 top 1 right 1 left
Carton	1	1	1	1	1
Std. Pkg.	10	10	10	10	10
Cat. No.	XPU	XPG	XP4	XP3	
List	\$2.00	\$1.40	\$1.40	\$1.40	\$.95

UNIONS, REDUCING UNION ENDS AND PLUGS FOR ABOVE BOXES

UM	Size	3/4"	1/2"	U	Size	3/4"	1/2"
	Carton	6	6		Carton	6	6
	Std. Pkg.	24	24		Std. Pkg.	24	24
	Cat. No.	UM-2	UM-1		Cat. No.	U-2	U-1
	List	.40	.35		List	.40	.35

Reducing Union Ends**Plugs for Closing Box Openings**

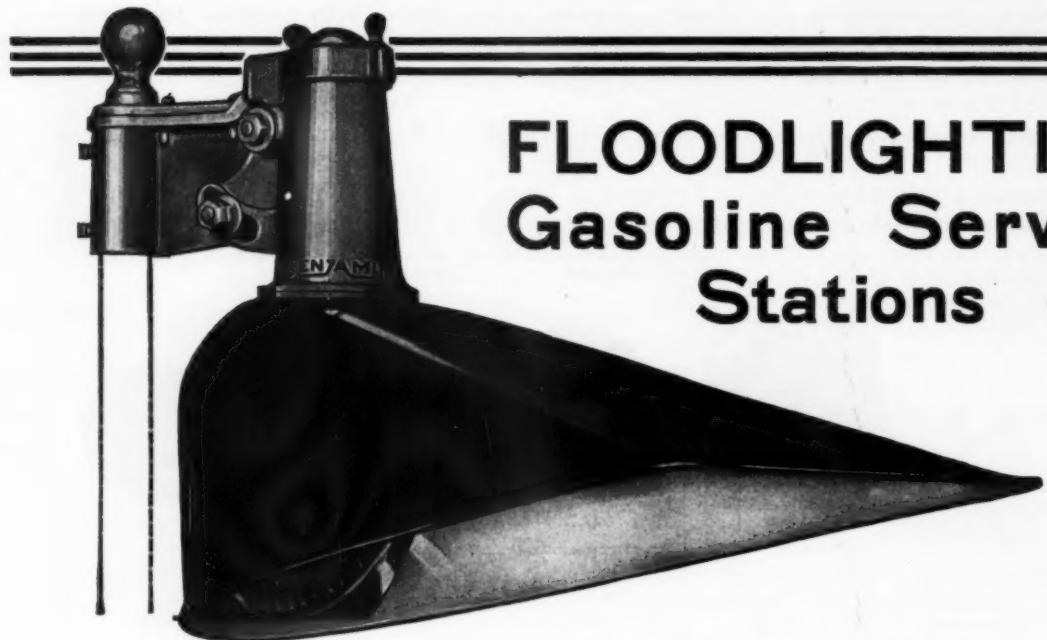
UR	For Changing 3/4" Conduit End to Take 1/2"		P	Size	3/4"	1/2"
	Carton	6		Carton	10	10
	Std. Pkg.	24		Std. Pkg.	50	50
	Cat. No.	UR-2		Cat. No.	P-2	P-1
	List	.07		List	.08	.06

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A Million Dollar



**FLOODLIGHTING
Gasoline Service
Stations « «**

BENJAMIN Duo-Service Floodlights

will help you get these jobs. They are going in everywhere. This two-in one floodlight provides uniform general illumination of the yard or service area, while at the same time spotlighting the exterior of the buildin to a higher intensity. Uses one 750, 1000 or 1500-watt Mazda lamp.



There is a Benjamin Floodlight for every kind of floodlighting job — Sport and Recreational, Decorative, Buildings, Industrial Yards, etc.



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General Offices
DES PLAINES

New York: 247 W. 17th St.

Market for 1932

Benjamin advertising to service stations is opening up opportunities for installations every day.



(A Two-in-One Floodlight)

Floodlights
the Ground

Spotlights
the Building

MORE LIGHT—MORE SALES

Attract Customers to the Station.
Make the Building and Grounds More Attractive.
Speed up Service.

**SELL MORE GAS, OIL AND
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Duo-Service Floodlight**

Manufactured exclusively by

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New York: 247 W. 17th St. San Francisco: 448 Bryant St.*

*An Irving-Cloud Publication
March, 1932*

Let Benjamin
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your share of
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able jobs.

*Write today for Sales
Helps and our Plan for
Selling Service Station
and other floodlighting
installations.*

33

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A.E.I.

NEWS AND SERVICE INFORMATION

MATERIAL FOR THIS DEPARTMENT IS SUPPLIED BY THE HEADQUARTERS STAFF OF THE ASSOCIATION OF ELECTRAGISTS, INTERNATIONAL 420 LEXINGTON AVENUE, NEW YORK, N. Y.

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Vice President, Earl N. Peak
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Contractors Organized for Industry Welfare

VOCATIONAL TRAINING

There is now pending before Congress a bill, H. R. 4757, introduced by Representative Reid of New York, which seeks to change the status and purposes of vocational education as now conducted, by the following measures:

- (1) By the elimination of the Federal Board for Vocational Education, and its accepted standards for training.
- (2) By the elimination of the Federal appropriations now available for the establishment of vocational training.
- (3) By the transfer of the sums previously appropriated to vocational education to a department of education for expenditures under the act of August 30th, 1890, through the Agricultural and Mechanical Colleges, instead of the continuation of the use of said money as it is now being expended.
- (4) By depriving the local boards of education of the sums now available by Federal appropriations in carrying on vocational education, and compelling the local boards of education to provide additional funds in order to continue the work which they are now performing with the assistance of the Federal appropriations.
- (5) By conferring upon the institutions of higher learning the distribution and use of the funds which are now expended in teaching vocational education to those who are unable to attend institutions of higher learning.

This bill is being opposed by many organizations now cooperating in the maintenance of vocational education. The Portland (Ore.) Chapter of Electragists reports that vocational education in Oregon is firmly established, and that the withdrawal of Federal support as indicated in the proposed bill would be a serious setback to such a program. Other Chapters are urged to give this bill investigation and to file with their Congressmen their attitude toward it.



PRIZE WINNER:—Louis D. Rubin, contractor-dealer, Charleston, S. C., has won over 20 prizes for artistic window displays and has had photos of these windows and stories of his business published 200 times in various publications. No wonder he smiles as he looks over this huge box of clippings. Prizes won range from blue ribbons and silver cups to touring cars.

RESOLUTION ON WIRING PRACTICE

The following resolution has been introduced in Electragist Chapters throughout the country:

WHEREAS: The Bureau of Standards, U. S. Department of Commerce, in urging the adoption of simplified practice by industries, has pointed out that the elimination of needless variety in types of everyday commodities means a more intelligent utilization of our resources, more efficient production with lower costs, greater productivity, lower maintenance expense, greater protection against unscrupulous traders, and with a path that is then clear for the agencies of standardization to improve the grades, quality and performance of the types that are retained in a simplified line; and

WHEREAS: During the past forty years the electrical industry has accumulated fifteen different wiring methods permitted in the Code, each of which has several hundreds, and in some cases thousands, of types and dimensions of fitting and parts constituting the system; and today there are knocking at the door of the Electrical Committee several additional wiring systems to further increase the complexities; and

WHEREAS: Steadily, little by little, the industry standards for safety to life and property have been pushed aside by interests seeking commercial advantages through attempting to cheapen wiring by substituting non-metallic wiring materials or concentric and bare-neutral wiring methods, for the sturdy, mechanically protected, properly insulated and grounded all-metal wiring systems; and

WHEREAS: The four basic types of all-metal wiring systems—standard rigid metal conduit, flexible metallic conduit, armored bushed cable and metal raceways—are ample to meet all needs of diversities in building conditions and occupancies, embodying greatest safety to life and property, with greatest flexibility and economy of installation, and permanency and efficiency of operation, resulting in greater public acceptance and satisfaction;

THEREFORE, BE IT RESOLVED—

That this Association goes on record as favoring:

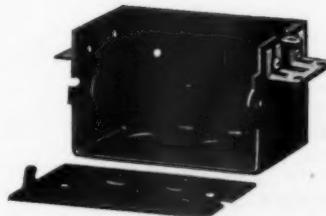
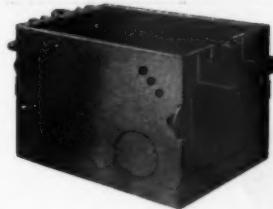
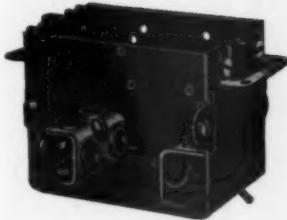
1. A statewide and nationwide program for standardization and simplification of wiring practice through the adoption of the all-metal types of wiring systems—standard rigid metal conduit, flexible metallic conduit, armored bushed cable, surface metal raceways, underfloor metal raceways and metal wireways, with all conductors insulated.
2. The enlistment of all contractors, inspectors, utility companies, architects, electrical workers and local regulatory bodies in securing the enactment of proper local electrical installation ordinances for safeguarding life and property, restricting approved types of wiring methods and materials to the all-metal types, with all conductors insulated, and with all conduits armored cable, raceways, wireways, boxes and fittings having metallic-coated surfaces, assuring continuous bonding and grounding.

STAR

Switch Boxes

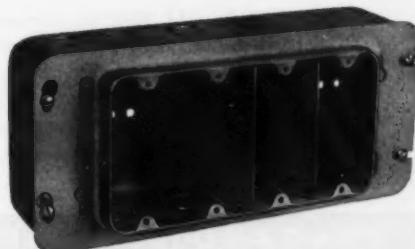
By

STEEL CITY



Embody all the up-to-date features, including Pri-out knockouts, latest approved clamps, adjustable ears, plenty of room inside for wires and a complete line that meets all requirements. Carried in stock by all Steel City Distributors who will be very glad to serve you.

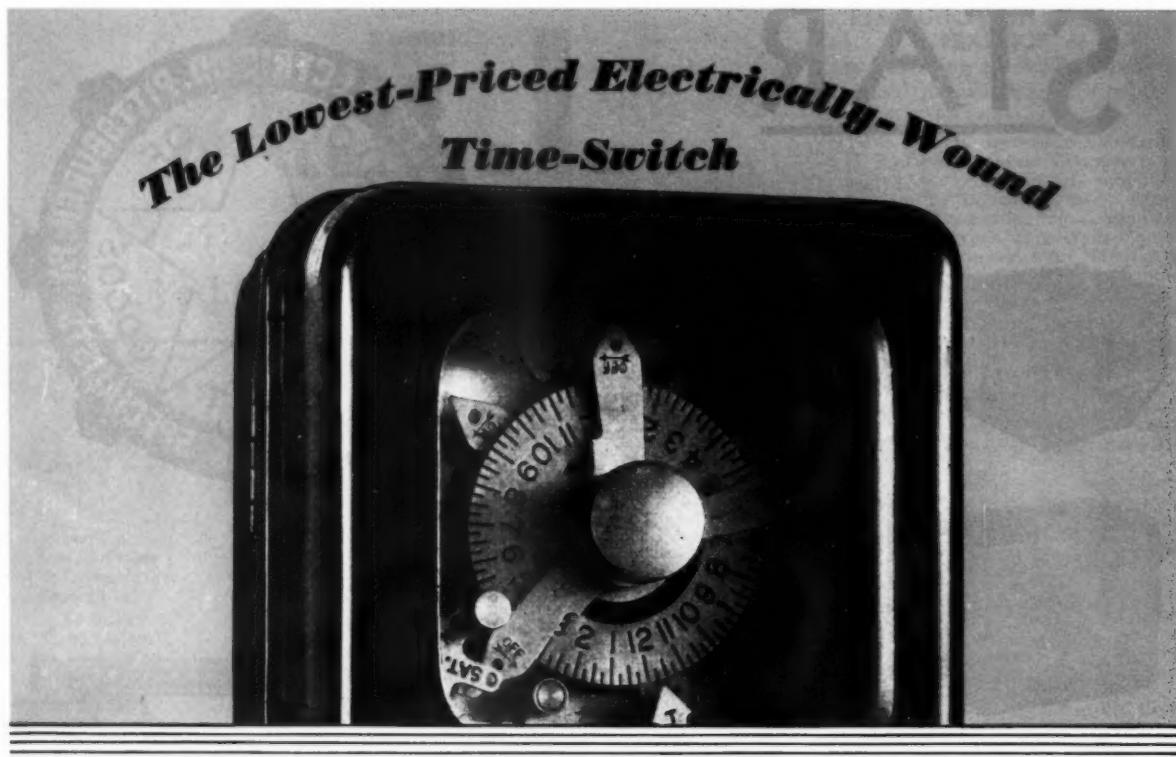
For Quality
and Service



Write for special Bulletin giving complete information on Gang Boxes and covers with partitions or barriers for use in connection with signaling equipment.

STEEL CITY ELECTRIC CO.

Pittsburgh, Pa.



The
SANGAMO
FORM VW

the ONE low-cost Time-Switch with ALL these features

ELECTRICALLY-WOUND by a powerful low-speed a. c. motor. During current interruptions, the mainspring carries on . . . with a 10-hour reserve.

DEPENDABLE TIMING . . . assured by a jeweled balance with a hairspring of special non-rusting, temperature-compensating alloy.

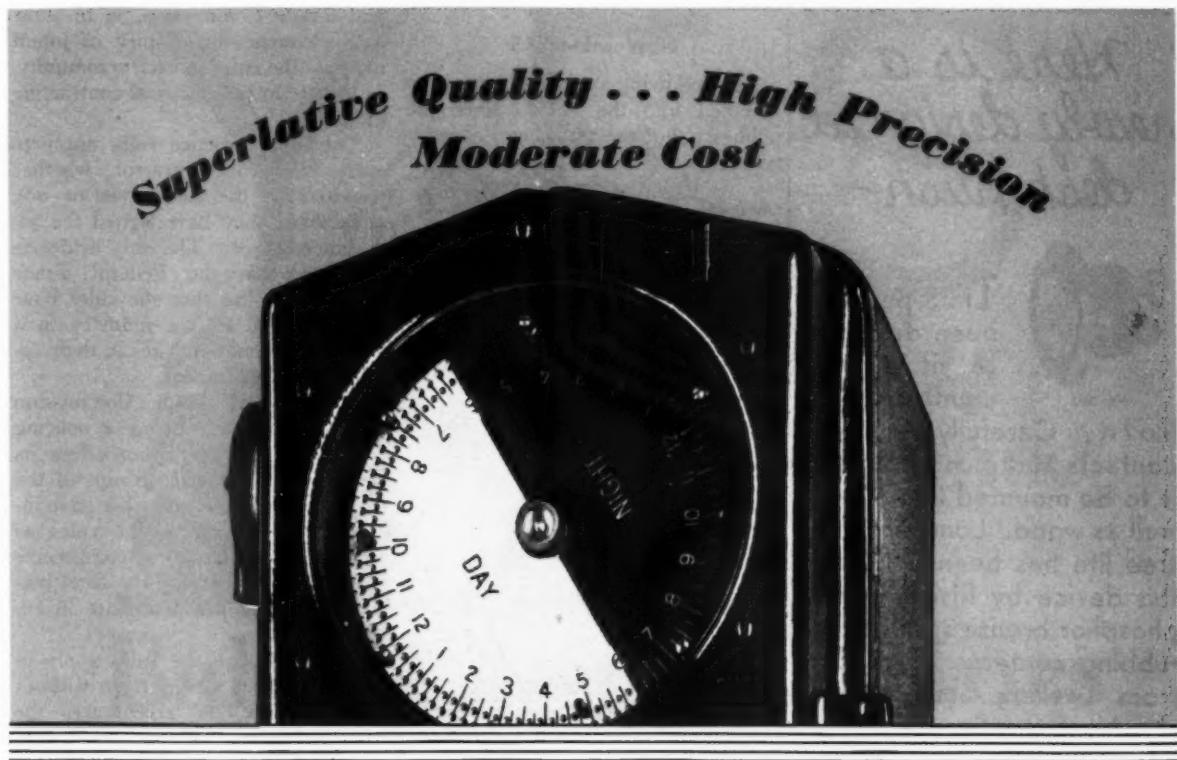
NEW TYPE MECHANICAL CONTACT . . . slow-opening, small gap. Revolutionary but thoroughly tested. An outstanding feature.

FREQUENCY OF OPERATIONS . . . three on and off periods each day. Sunday and holiday cut-out. Manual operation without disturbing the sequence.

DUST-PROOF CASE . . . made of pressed steel, with pry-outs bottom and back.

FULLY GUARANTEED . . . by Sangamo Electric Company, with sales, service and engineering facilities adequate to care for any requirement. Send for literature.

SANGAMO ELECTRIC COMPANY • SPRINGFIELD, ILLINOIS



**The
SANGAMO TYPE T**

**An All-American Precision Instrument for
commercial switch-control applications**

The Sangamo Type T Time-switch is built up to the highest standard of quality, accuracy and performance. You can expect from it years of trouble-free service.

The Type T with meter terminal base, is particularly suited to the needs of electric light and power companies. It is also available with conduit connected base, making it suitable to any commercial application.

The principal features are:

- 1 . . . Timing of Railroad Watch Accuracy . . .** insured by the finely finished standard Sangamo clock movement with Hamilton 11-jewel escapement. A micrometer type regulator permits extremely close adjustment and an Elinvar hair-spring compensates for variations in temperature.
- 2 . . . Electric winding . . .** The switch mechanism is operated by a clock-mainspring, kept wound by a Sangamo Motor which is continually in circuit. Because of ample reserve power, the switch is unaffected by current interruptions.
- 3 . . . Frequent operation . . .** The dial is so arranged that the number of operations can be varied as needed . . . from one "open" and one "close" in the 24-hour cycle, up to 96 operations, or one every 15 minutes.
- 4 . . . Mercury tube contacts of latest design, shown by field tests to be absolutely dependable in service.**
- 5 . . . Independent of frequency or voltage variations.**
- 6 . . . Made for either a. c. or d. c. operation.**
- 7 . . . Low maintenance cost . . . simple, sturdy design assures trouble-free operation. All parts interchangeable.**

Write for descriptive folder giving complete details.

SANGAMO ELECTRIC COMPANY • SPRINGFIELD, ILLINOIS

Here is a newly designed desk push-



THIS push has been designed to fit a five-eighths inch hole. Carefully insulated contacts and plunger enable it to be mounted in metal as well as wood. Long, trouble-free life has been built into this device by fitting it with phosphor bronze springs and rubbing contacts. Freedom from swelling and sticking due to absorption of atmospheric moisture has been insured by the use of laminated bakelite in place of fibre. The genuine shell pearl center lends a lasting, pleasing appearance.



Every electrical contractor should have this catalog showing this and other pushes, bells and annunciators.

Without any cost or obligation, send it to me

NAME _____

FIRM _____

ADDRESS _____

The ANSONIA



Electrical
Company
Ansonia, Conn.

ANNUNCIATORS • BELLS • BUZZERS
PUSH BUTTONS • WIRE

NEW MEMBERS

The following applicants have been accepted into the A.E.I. since the publication of the list in the February issue:

CALIFORNIA

Oakland: Spencer Elec. Co.

FLORIDA

Miami: William Hepburn & Co.

Tampa: Chaney Electric Co.
J. T. Dolphy

IOWA

Waterloo: H. R. Plowman

NEW JERSEY

Newark: Edward J. White Co.

Passaic: Snyer Electric Co.

eral Trade Commission, is to show to the commission a spirit of intent to apply the rules in each community, as leaders in the electrical contracting industry.

The trade practice rules apply to every electrical contractor, whether members of the association or not, or whether they have signed the acceptance or not. The only evidence, however, that the Federal Trade Commission has that the rules have been accepted by the industry in a particular community lies in their receipt of acceptances.

The Federal Trade Commission does not set itself up as a policing or enforcement body, but offers its support to responsible groups of the industry in communities that have indicated acceptance of the rules as applying to their own competitive field, and who provide the local machinery for proper procedure in enforcement.

Thus, although the rules apply to individuals who violate them without having signed an acceptance, the commission would undoubtedly move more slowly in acting against such violator if they had no evidence that the rules had been generally accepted and recognized as definitions of fair practice by a considerable percentage of those engaged in competition in the particular industry in that community.

ACCEPTANCE OF TRADE PRACTICE RULES

A number of local chapters have reported to headquarters that they have formally adopted the Trade Practice Rules approved by the Federal Trade Commission, and have filed with the Commission their acceptance of the rules as a body, as well as filing individual acceptance by each member. Both of these steps are desirable.

The effect of this filing of the form of acceptance requested by the Fed-



CONTRACTORS MEET WITH POWER COMPANY:—The electrical contractors in Madison, Wis., are a live bunch, and one reason why they get somewhere is because they are always promoting conferences with representatives of other branches of the industry as well as those in other parts. This group of seven have just come out of a meeting with representatives of the local utility. Left to right they are: Otto Harloff, L. W. Burch, R. J. Nickles, Albert J. Endres, Orvin T. Havey, William C. Schlosser, and O. M. Bradford.



YES

...there *is*
a difference
in
Ball Bearing Motors



from excessive maintenance costs even where operating conditions were especially severe.

The soundness of this early belief has been demonstrated. Today, practically all motor manufacturers have followed the lead of Fairbanks-Morse and are now marketing ball-bearing motors.

The contractor in seeking a motor which will support his reputation and judgment with his trade, might assume that there is little difference between one ball-bearing motor and another. Unless he makes a careful and painstaking investigation!

Yes—there is a difference in ball-bearing motors. A difference which the pioneer always has in his favor. *And that difference is in experience!*

Eighteen years ago, Fairbanks - Morse pioneered the ball-bearing motor with the firm belief that motors of this type would offer industry a new reliability and freedom

The Fairbanks-Morse Ball-bearing Motor of today is the product of the pioneer's experience. We invite you to make a comparison between this F-M Motor and any other which you now believe to be a good motor. From the *sealed bearing construction* incorporating the *highest priced ball bearings in the world* — the permanently plastic insulation — to the frame — stator — and rotor — check the F-M motor *comparatively* point by point.

Your own practical knowledge will understand and appreciate the *experienced* design and construction which is evident in every detail. *Then*, you will understand why users of F-M Ball-bearing Motors specify them year after year in repeat purchases. You will see why this motor can be entrusted with your recommendation to your trade.

May we send literature? Or perhaps better, have an engineer call and explain this difference in ball-bearing motors?

FAIRBANKS, MORSE & CO.

900 S. Wabash Ave., Chicago

32 branches at your service throughout the United States

FAIRBANKS-MORSE

motors

POWER, PUMPING AND



WEIGHING EQUIPMENT

5600—EA 40, 42

IN THE EDITOR'S MAIL

CODE VIOLATION

Editor,
ELECTRICAL CONTRACTING.

On page 87 of your January, 1932, issue of ELECTRICAL CONTRACTING you show a photograph of a switch or outlet box connected to the conduit by a locknut and bushing and with no other method of support. This seems to be a direct violation of the rules as given in the current issue of the National Electrical Code, Article 7, Section 703, paragraph "d," which plainly states that "Approved metal supports shall be used in new work for boxes and fittings which are not secured to a stud, joist or similar fixed structural unit. Lath of wood, metal or composition shall not be considered a structural unit."

Further, paragraph "g" of the same Section states that "Boxes, cabinets and fittings shall be securely fastened in place." It is therefore very evident that the type of construction shown would be a direct violation of the National Electrical

Code, and as such would not be given publicity in your publication.

While I believe that your public is very strongly in favor of Code rules and enforcement, this item apparently has not been carefully scrutinized before printing.

C. M. WOOLEY,
Secretary & Treasurer,
Ohio Chapter, Western Section
I.A.E.I.
Columbus, Ohio.

LOSSES FROM OPEN FUSING

Editor,
ELECTRICAL CONTRACTING:

An owner of a large apartment building claimed his light bills were too high. He said the power company had made prolonged tests to insure no leakage, and found none.

On examining the lighting panels I found that most of the No. 14 branch circuits were fused with 25 and 30 amp. fuses. There being only one lighting meter for the building, and in some cases more than one apartment per circuit, I came to the conclusion that there was a possibility for a saving.

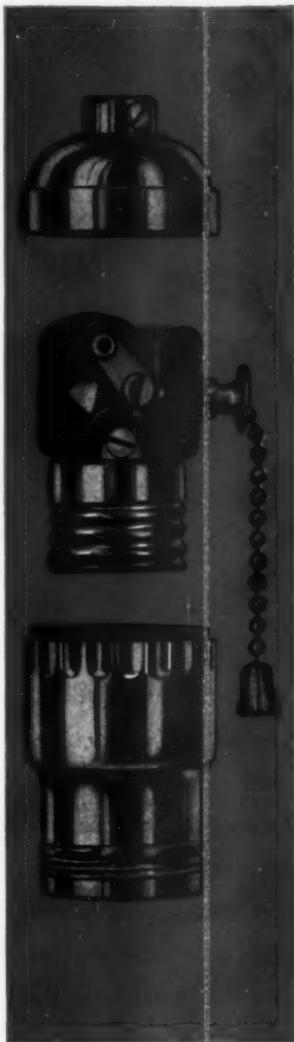
Wherewith I concluded that if a No. 14 wire is safely rated at 15 amps. and should in any way become subjected to a 25 amp. load, there must be a loss. So I took 50 ft. as the average run (not considering value of "M" in a.c. circuits),

(Continued on Page 69)



FIVE BROTHERS IN BUSINESS TOGETHER:—On the left is Joe Rapport, president of the Superiorlite Co., Cleveland, Ohio, followed by Harry, Joe, H. S., Isadore and M. Rapport. The last named, who is manager, founded the company, which celebrated its fifteenth anniversary on March 12. This firm, which is one of the largest of Cleveland house wiring contractors, still has some customers who patronized it in the beginning.

G-E SOCKETS *for* *every* REQUIREMENT



Every day more contractors are using G-E sockets and taking advantage of the completeness of the General Electric line, which has a socket for every requirement.

G-E sockets feature the new improved socket interiors, with the sealed-in mechanism and moulded parts made of Textolite—sturdy, compact construction—simple, efficient mechanism with smooth quick action.

G-E offers you three distinct types of sockets. Brass shell fluted catch sockets designed especially for fixture wiring installations, . . . the brass shell threaded catch and the Textolite shell threaded catch sockets for bracket installations, portable lamps, cord suspensions, and general industrial uses.

General Electric sockets are economical to install, because they are easy to wire, easy to assemble. They are efficient in operation and have extra long life.

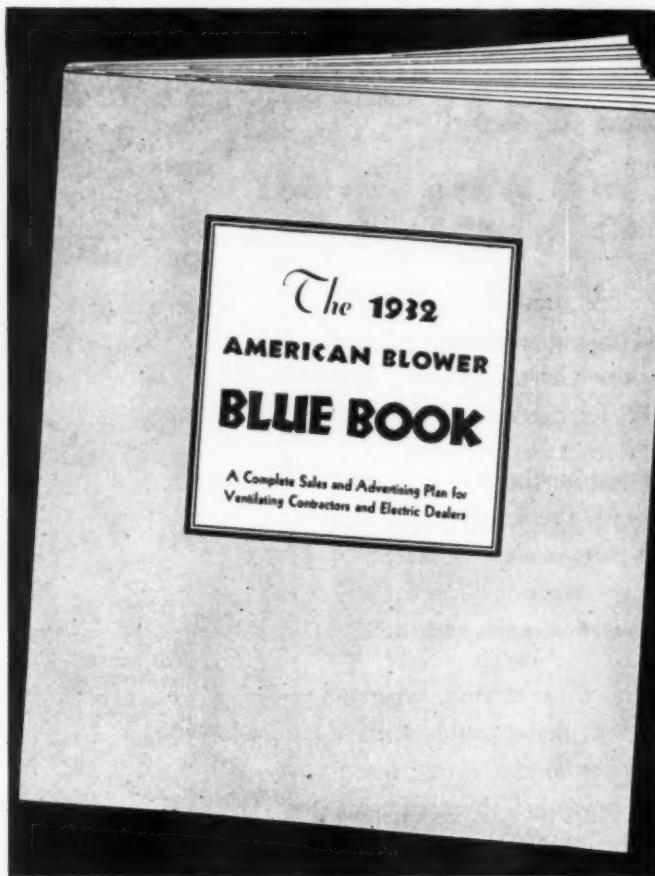
Order a supply of G-E sockets from your nearest General Electric Merchandise Distributor or write Section D-323, Merchandise Department, General Electric Company, Bridgeport, Connecticut.



GENERAL ELECTRIC

WIRING DEVICES

MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONNECTICUT



OUR BLUE BOOK

MAKES IT HOT
FOR
OLD MAN
GLOOM



... IT SHOWS YOU HOW TO GET MORE SALES, INSTALLATIONS and PROFITS

Chart your course and then follow it! It's the safest and best way of making your business go ahead.

As a starting point, write today—NOW—for your copy of the 1932 American Blower Blue

Book. It is a book full of tested and practical sales and advertising helps. It shows you *when, where and how* to sell electric ventilating equipment for stores, restaurants, offices, factories, garages, shops—for every type of business. It makes available to you *entirely without cost* folders, cards, surveys, envelope stuffers that are specially designed for you . . . that are printed with *your own address and message*.

SEND THE COUPON FOR YOUR COPY TODAY!

AMERICAN BLOWER CORPORATION
6000 Russell Street
DETROIT, MICHIGAN

Gentlemen: Please send me a copy of the 1932 American Blower Blue Book at once. I understand I will not be obligated.

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Street _____
City _____ State _____ (1188)

AMERICAN BLOWER CORPORATION, DETROIT, MICH.
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONT.
BRANCH OFFICES IN ALL PRINCIPAL CITIES

American Blower
SIROCCO VENTILATING, HEATING, AIR CONDITIONING, DRYING, MECHANICAL DRAFT
MANUFACTURERS OF ALL TYPES OF AIR HANDLING EQUIPMENT SINCE 1881

Suggested RESALE PRICES *for* Wiring Supplies

The prices listed on the following pages are merely suggested resale prices for the commonly used standard supplies and equipment employed in electrical construction work. They are based on average current trade costs throughout the country, very largely obtained from jobbers' price sheets, and are also based on average overhead charges.

* * *

Obviously, prices can be suggested only for the widely used products that are nationally distributed, and under no circumstances is this section intended to function as a directory of products or manufacturers.

* * *

The publishers wish to again emphasize that these are merely *suggested* resale prices and while every effort is made to make them universally applicable and accurate we cannot guarantee them or assume any responsibility for errors.

* * *

The prices appearing in this section will be completely revised each month as trade prices may change.

These prices apply only to the United States.

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Electrical Trade Publishing Co.

Index

To Suggested Resale Prices

A

	Page
ACORNS—for Cords and Chains	PL-4 & 19
ADAPTORS and Reducers for Sockets	PL-4 & 19
ADAPT Fittings and Boxes	PL-12 & 14
ADJUSTERS—for Cords	PL-4
ANCHORS or Expansion Shields	PL-10
ANNUNCIATORS—Bell	PL-4
ANNUNCIATOR Wire	PL-29
APPLETON Entrance Fittings	PL-13
ARMORED CABLE—BX and Similar	PL-9
" " Fittings	PL-14
ASBESTOS Millboard	PL-4
" " Cord for Appliances	PL-8
" " Range Wire	PL-29
ATTACHMENT Plugs and Caps	PL-16
ATTACHMENTS—for Full Sockets	PL-4

B

BABY KNIFE SWITCHES	PL-21
BAR Hangers for Boxes	PL-5
BASES—for Sockets	PL-19
BAYONET Sockets	PL-19
BELLS AND BUZZERS	PL-6
BELL Announciators	PL-4
" " Cords	PL-8
" " Transformers	PL-28
" " Wire	PL-29
BENDS and Elbows for Rigid Conduit	PL-9 & 10
BEND HICKS and Elbow Fittings	PL-13
" " Enclosed Fuses	PL-9
BOLTS—Carriage, Stove and Toggle	PL-8
" " Expansion and Anchor	PL-10
BOX—Connectors or BX Fittings	PL-14
BOXES—Adapt Boxes	PL-13
" " Cable and Loom	PL-4 & 6
" " Concrete	PL-5
" " Conduit	PL-4 & 6
" " Cutout or Service	PL-6
" " Floor	PL-6
" " Handy or Utility	PL-8 & 8
" " Laundry	PL-4
" " Mail	PL-15
" " Outdoor Meter	PL-23 & 26
" " Outlet	PL-4 & 5
" " Switch	PL-4
" " Kratz Switches—See Switches	PL-9
BRACKETS, Racks and Wireholders	PL-7 & 8
BREWERY CORD	PL-8
BUSHINGS for Rigid Conduit	PL-8 & 9
" " Porcelain	PL-5
" " for Sockets	PL-6 & 19
BUTTONS—Push for Bell Work	PL-6 & 7
" " Ceiling P. & S. Porcelain	PL-8
BUZZERS AND BELLS	PL-6
BX-BXL Armored Cables	PL-9

C

CABINETS—Meter and switch	PL-16
CABLES—Armored and Lead Covered	PL-9
" " Deck	PL-8
" " Non-Metallic Romez, Etc.	PL-9
" " Paching House	PL-8
" " Park—Non-Metallic	PL-29
" " Park—Steel Taped	PL-29
" " Rubber and Lead Covered	PL-29
" " Stage	PL-8
CANDLE Sockets	PL-19
CANDELABRA Sockets	PL-19
CANOPY Switches	PL-20 & 21
CANVASITE Cord	PL-8

C—Continued

CAPS—For Attachment Plugs	PL-16
" " Entrance Fittings	PL-13
CARRIAGE Bolts	PL-8
CRILING Switches	PL-21
" " Buttons	PL-8
CHASE NIPPLES and Couplings	PL-16
CHAIN for Full Sockets	PL-19
CIRCUIT Boxes and Residence Panels	PL-17
CLAMPS—Grounding	PL-9
" " Hangers	PL-15
" " Table for Bell Work	PL-7
" " on Straps for Pipe	PL-9 & 27
CLEAT Rosettes	PL-19
CLEATS—Porcelain Insulator	PL-15
CLIPS or Straps for Pipe	PL-9 & 27
" " for Loom	PL-9 & 18
COLORING Fluid or Liquid	PL-9
COMMERCIAL Glassware	PL-14
CONCRETE Boxes	PL-5
CONDUIT—Rigid or Flexible Metal	PL-8
" " Bushings and Locknuts	PL-8 & 9
" " Couplings	PL-9
" " Elbows and Beads	PL-9 & 10
" " Fittings All Types	PL-11 to 14
" " Flexible Armored	PL-9
" " Hangers	PL-15
" " Locknuts and Bushings	PL-5 & 9
" " Nipples	PL-16
" " Pennies	PL-9
" " Reducers	PL-9 & 16
" " Thin Wall	PL-9
CONDULETS—Fittings	PL-11 & 12
CONNECTORS—Armored for BX, Etc.	PL-14
" " Solderless	PL-19
" " Fixture, Wire & Cord	PL-19
" " Greenfield and BX	PL-14
" " Cord and Motor	PL-19
COMPOUND—Pothead	PL-17
CORDS—All Types	PL-8
" " For Full Sockets	PL-19
" " Extension—Made-Up	PL-10
CORD Adjusters	PL-4
" " Armored Lamp	PL-9
" " Connectors	PL-9 & 10
COUPLINGS—For Conduit	PL-9
COVERS for Outlet Boxes	PL-4 & 5
CURRENT TAFS	PL-19
CUTOUT Boxes—Steel	PL-6
CUTOUTS—Plug & Cartridge Enclosed	PL-9

D

DAMP PROOF Office Wire	PL-29
DECK Cable	PL-8
DELTABESTON Cord	PL-8
" " Wire	PL-28
DIM-A-LITE Sockets	PL-19
DOOR Switches and Openers	PL-21
" " Trips and Springs	PL-7

E

ELBOWS or Beads or Conduit	PL-9 & 18
ELECTRIC—Range Units	PL-19
ELECTROLET Entrance Fittings	PL-13
ENCLOSED Fuses	PL-10
" " Cutouts	PL-9
ENTRANCE Fittings	PL-13
" " Panel Switches Plug Type	PL-21
" " Safety Switches	PL-21 to 27
ERICKSON Couplings for Conduit	PL-9
EXPANSION Shields and Anchors	PL-10
EXTENSION Cords made up	PL-10
" " for Sockets	PL-19

F

FAN HANGERS	PL-15
FEDERAL Bushings and Similar	PL-5
FEED THRU and Pendant Switches	PL-21
FITTINGS—Armored Cable	PL-14
" " Adapti	PL-13 & 14
" " Condulets and Similar	PL-11 & 12
" " Electrolets and Similar	PL-13
" " Entrance All Types	PL-13
" " Groundlets	PL-16
" " Kodus Threadless	PL-12
" " Spraglets and Wireless	PL-13
FIXTURE Blocks—Wood	PL-8
" " Cords	PL-8
" " Studs	PL-27
" " Wire	PL-29
FLASHERS—Sheedoo Plugs	PL-16
FLEXIBLE Metal Conduit	PL-9
" " Loom—Non-Metallic	PL-15
FLOOR Pushes and Treads	PL-6
" " Boxes	PL-6
FLUSH Receptacles	PL-17 & 18
" " Switches and Plates	PL-28
FRICTION Tape	PL-27
FUSES—All Types	PL-10
" " Blocks—Enclosed	PL-9
FUSE Wire	PL-10
FUSENTERS and House Panels	PL-17

G

GASKETS—For Condulets	PL-11
G. E. Fittings—Entrance	PL-13
GEE VEE Fittings—Entrance	PL-13
GLASSWARE—Commercial	PL-16
" " —Moderistic	PL-14
GREENFIELD Flexible Conduit	PL-9
" " Connectors for Flexible	PL-14
GROUNDING Clamp	PL-9
GROUND Rods	PL-18
GROUNDULETS Fittings	PL-16
GUARDS—Lamp	PL-14

H

HANDY BOXES	PL-5
HANGERS—Conduit and Cable	PL-15
" " Fan	PL-15
" " for Outlet Boxes	PL-5
HANDLES—For Sockets	PL-19
" " For Snap Switches	PL-20
HOLDERS—Shade	PL-15
HOUSE RACKS and Wireholders	PL-8

I

INCREASERS for Conduit	PL-16
INSULATED Nails	PL-16
INSULATING Links for Chain	PL-15 & 19
" " Paint or Varnish	PL-17
" " Staples	PL-16 & 27
IRON Plugs	PL-17

K

KNIFE Switches—Baby	PL-21
KNOBS—Tubes and Cleats	PL-14 & 15
KONDU Threadless Fittings	PL-12 & 13

L

	Page
LAG Screws.....	PL-27
LAMP GUARDS.....	PL-14
LAUNDRY Boxes.....	PL-4
LEAD Covered Armored Cables.....	PL-9
" Covered & Rubber Cov. Cables.....	PL-29
LEVOLIKE Switches.....	PL-21
LINKS—Insulating.....	PL-15 & 19
" Renewable Fuse.....	PL-10
LIQUID for Coloring.....	PL-9
LOCKNUTS—Conduit.....	PL-8 & 15
LOOM—Non-Metallic Flexible.....	PL-15
" Clips.....	PL-9
LOCUST Fins.....	PL-7
LUGS—Soldering for Wires.....	PL-15
LUMINOUS Arcas for Cords.....	PL-4 & 19
" Buttons for Switches.....	PL-20

M

MAGNET Wires.....	PL-29
MAIL Boxes.....	PL-15
METAL Molding.....	PL-15
" Wiremold.....	PL-16
" Reflectors.....	PL-19
METER Boxes and Switches Outdoor.....	PL-22 & 26
METER and Switch Cabinets.....	PL-16
METER Service Switches.....	PL-21 to 27
MINIATURE and Candelabra Sockets.....	PL-18
MOGUL Sockets.....	PL-19
MOTOR Cord Connectors.....	PL-10
MOLDING Metal.....	PL-15 & 16
" Wiremold.....	PL-16
MULTI Bushings.....	PL-5

N

AILS—Insulated.....	PL-16
IPPLES for Conduit.....	PL-16
ON-METALLIC—Park Cables.....	PL-29

O

OFFICE Wires.....	PL-29
OPENERS—Door.....	PL-21
OUTDOOR Meter, Boxes and Switches.....	PL-22 & 2
OUTLET Boxes and Covers.....	PL-4 & 5
OVALDUCT Metal Molding.....	PL-16

P

PANELBOARDS Small House Type.....	PL-17
PANEL Switches.....	PL-21
PARK Cable.....	PL-29
PASTE Soldering.....	PL-27
PENDANT Switches.....	PL-21
PENNIES—Conduit.....	PL-9
PINS—Locust.....	PL-7
PIPE—Rigid Conduit.....	PL-9
" Clamps and Straps.....	PL-9 & 27
" Nipples.....	PL-16
" Threaded.....	PL-17
PLATES for Receptacles.....	PL-18
" for Switches.....	PL-20
PLUG Cutouts.....	PL-9
PLUGS—Attachment and Appliance.....	PL-16
" Conduit.....	PL-9

P—Continued

	Page
POTHEAD Compound.....	PL-27
PORCELAIN Bushings.....	PL-5
" Cutouts.....	PL-9
" Knobs and Tubes.....	PL-15
PUSH Buttons, Treads, Springs.....	PL-7
R	
RACKS and Wireholders.....	PL-7 & 8
RADIO RECEPTACLES.....	PL-18
RANGE—Units, Electric.....	PL-19
RAWLPLUGS.....	PL-19
RECEPTACLES—Flush.....	PL-17 & 18
" Radio.....	PL-18
" Sign.....	PL-18
" Surface.....	PL-18
" for Conduit.....	PL-10 to 16
REDUCERS—Conduit.....	PL-9 & 16
" Chase.....	PL-16
" Socket.....	PL-4
REFLECTORS—Metal.....	PL-19
REMOTE CONTROL Switches.....	PL-21
RODS for Grounding.....	PL-18
ROMEX and Similar.....	PL-9
ROSETTES—Porcelain.....	PL-18
" for Conduit Fittings.....	PL-11 to 14
RUBBER TAPE.....	PL-27
S	
SAFETY Switches—All Makes.....	PL-21 to 26
SALTIS—Soldering.....	PL-26
SCREWS—Lag.....	PL-27
" Machine and Wood.....	PL-26
SERVICE Boxes or Cutout Boxes.....	PL-6
SHADE HOLDERS—Standard.....	PL-15
SHIELDS—Expansion.....	PL-10
SKEEDOOLE Flasher Plugs.....	PL-17
SLATE Base Cutouts.....	PL-9
SNAP Switches—Wall.....	PL-20
" Switches—Pull Cord Type.....	PL-20 & 21
SOCKETS—All Types.....	PL-19 & 20
SOCKET Adapters.....	PL-4
" Attachments.....	PL-4
" Bushings.....	PL-5 & 19
" Extensions.....	PL-19
" Handles.....	PL-19
" Twin.....	PL-19
SOLDER—All Types.....	PL-27
" Paste.....	PL-27
SOLDERING Lags.....	PL-15
SOLDERLESS Connectors.....	PL-19
SPACKERS—For Boxes.....	PL-4
SPEAKING Tubes.....	PL-15
SPRAGULETS Fittings.....	PL-13
SPRINGS—Window and Door.....	PL-6 & 7
SQUEEZE Connectors.....	PL-14
STAPLES for Bell Work.....	PL-16 & 27
STEEL Taped Park Cable.....	PL-29
STOVE Bolts.....	PL-8
STRAPS and Pipe Clamps.....	PL-9 & 27
STUDS for Fixtures.....	PL-27
SWITCH Boxes.....	PL-4
" Plates.....	PL-20
SWITCHES—Canopy.....	PL-21
" Door.....	PL-21
" Entrance and Panel.....	PL-21 to 27
" Flush-Push-Tumbler.....	
" Snap.....	PL-20
" Knob.....	PL-21
" Meter and Cabinet.....	PL-16
" Panel.....	PL-21

S—Continued

	Page
SWITCHES—Pendant and Feed Thru.....	PL-21
" Pull Cord.....	PL-20 & 21
" Remote Control.....	PL-21
" Time.....	PL-28
SWITCHES SAFETY ENTRANCE TYPE	
Building.....	PL-24 & 25
Columbia.....	PL-25
Murray.....	PL-26
Noark.....	PL-24
Square D.....	PL-21 & 22
Trumbell.....	PL-22
Trumbell-Vanderpool.....	PL-22 & 23
Wadsworth.....	PL-25 & 26
Westinghouse.....	PL-23 & 24

T

TABLE Clamps.....	PL-7
TAPE—Friction and Rubber.....	PL-27
TALETTS—Conduit Fittings.....	PL-11
TAP—Current.....	PL-19
TELEPHONES.....	PL-27
" Wire.....	PL-29
TERMINALS and Soldering Lugs.....	PL-15
THIN Wall Conduit.....	PL-9
THREADED Pipe.....	PL-17
THREADLESS Conduit Fittings.....	PL-13
TIME Switches.....	PL-27 & 28
TOGGLE Bolts.....	PL-8
" Switches.....	PL-20
TRANSFORMERS—Bell and Toy.....	PL-28
TREADS—Floor.....	PL-6 & 7
TUBES—Porcelain.....	PL-15
" Speaking.....	PL-15
TUMBLER Switches and Plates.....	PL-19
TWIN Sockets.....	PL-19

U

UTILITY Boxes.....	PL-5
UNILETS Conduit Fittings.....	PL-11

V

V. V. FITTINGS for Conduit.....	PL-11
VAPORPROOF Fittings.....	PL-12
VARNISH and Paint.....	PL-17

W

WEATHERCAPS Entrance Fittings.....	PL-13
WEATHERPROOF Wire.....	PL-29
" Conduit Fittings.....	PL-12
WIRE—Rubber Covered.....	PL-29
" Weatherproof.....	PL-29
" Annuscator.....	PL-29
" Asbestos Range.....	PL-29
" Connectors.....	PL-10
" Damp Proof.....	PL-29
" Deltabeston.....	PL-29
" Lead and Rubber Covered.....	PL-29
" Magnet.....	PL-29
" Telephone and Telegraph.....	PL-29
WIREHOLDERS and Brackets.....	PL-7
WIRELETS and Spragulets.....	PL-13
WIREMOLD.....	PL-16
WOOD Fixture Blocks.....	PL-8

Suggested Resale Prices for Wiring Supplies

These are merely suggested resale prices for the commonly used products that appear regularly on jobber price lists. They are figured on generally accepted principles for computing resale prices and should cover average conditions but are not guaranteed. (See note on title page.)

A-SUNDRIES

ASBESTOS

Asbestos Millboard—Per Pound—38c.

ANNUNCIATORS

House-Surface Type—Hand Reset

No.	Wood	Ansonia	Edwards	Dixie	Edw. & Faraday	No. 81 or 373	White	Enamel	Compe-	P. & W.
2	\$ 8.25	\$11.00	\$ 9.85	\$13.00	.....	.....	.....	.....	.....	.....
3	9.35	12.45	11.60	14.80	.....	.....	.....	.....	.....	.....
4	10.90	13.60	13.05	16.40	.....	.....	.....	.....	.....	.....
5	12.65	14.85	.....	.....	.....	.....	.....	.....	.....	.....
6	13.60	16.10	16.40	19.40	16.50	19.80	.....	.....	.....	.....
8	16.10	18.90	19.40	22.75	19.80	24.75	.....	.....	.....	.....
10	19.00	21.60	22.75	26.00	23.10	29.70	.....	.....	.....	.....
12	21.50	24.25	25.90	29.15	26.40	30.70	.....	.....	.....	.....
15	27.00	30.25	.....	.....	.....	.....	.....	.....	.....	.....
16	35.90	40.85	34.60	40.00	34.65	40.00	.....	.....	.....	.....
20	.....	.....	.....	.....	.....	42.90	.....	.....	.....	.....
Extra Drops	.....	.....	2.25	3.00	.....	.....	.....	.....	.....	.....

(All other Annunciators—Sell at List less 10%)

COUCH

Electrical Reset

Number of Drops	Style D Face Type Wood Face	Style F Flush Wood Face	Style F Flush Metal Face
4	DA 4 \$21.50	FA 4 \$44.80	FA 4 \$49.80
6	DA 6 26.50	FA 6 49.30	FA 6 55.00
8	DA 8 31.50	FA 8 53.80	FA 8 59.70
10	DA 10 36.50	FA 10 58.25	FA 10 64.70
12	DA 12 43.10	FA 12 64.25	FA 12 71.30
15	DA 15 56.50	FA 15 73.10	FA 15 81.50
16	DA 16 56.50	FA 16 73.10	FA 16 81.50
20	DA 20 69.75	FA 20 88.15	FA 20 98.00

ADAPTERS & REDUCERS

For Sockets and Vases

Mogul to Medium	.....	Price \$0.50
Medium to Candelabra	.....	.25
Candelabra to Miniature	.....	.20
Medium to Intermediate	.....	.25
Parallel Blades to Edison	.....	.35
Plug in Full Socket	.....	1.90
Vase Adapters, Benjamin No. S, 831, 832, 833—Each	.....	2.00
Two-Light Vase Adapter, Brush Brass or Gun Metal, Complete with Pull Sockets, Plug, 6 feet Silk Cord—Rodale No. V-41	.....	4.00

EXTENSION ARMS FOR PULL SOCKETS

For Brass or Porcelain Sockets with 8"-10"-12" or 14" Reflec. \$0.65
16"-18" or 20" " .70

ADJUSTERS For Cords

Universal Cord Adjuster Standard Size No. 1417 3 3/4" Long	.....	Price \$1.10
" " " Factory No. 1418 5 1/2" Long	.....	.15
" " " Reinforced No. 1419 5 1/2" Long	.....	.20
Ball Type No. 1403 & 5 for Type C Cord, 3/16" hole	.....	.10
" " " No. 4634 & 5 for Reinforced Cord, 3/16" hole	.....	.12

ACORNS & TASSELS

Luminous Acorns and Pendants for Pull Chain	.....	\$0.30
Brass Acorns and Tassels for Pull Chain	.....	.10
Brass Acorns Adjustable for Linen Cord	.....	.10
Insulating Link for Pull Chain	.....	.15

These prices apply only to the United States

BOXES, SWITCH

SECTIONAL SWITCH BOXES

Single Gang—For Switch and Recep. for Old or New Work			Price
For Loom	2 2 1/2" or 2 3/4"	Without clamps	Black \$1.17 Galvd. \$1.19
" "	2 1/2" " 2 3/4"	With "	.15 .18
For BX Cable	2 1/2" " 2 3/4"	With "	.16 .18
" "	2 1/2" " 2 3/4"	With "	.32 .35
For Rigid Conduit	1 1/2" to 2 3/4"	Without "	.19 .22
" "	2 1/2" " 2 3/4"	Without "	.32 .35
Spacers—For Spacers only deduct from any of above prices....			.03 .04
Kruze Sw. Box Supports—G. E. No. 6610—16 1/2" Long			.15

With BRACKETS or EXTENDED EARS or LATH SUPPORTS For New Work

For Loom	Depth	Price
" "	2 2 1/2" or 2 3/4"	Without clamps
" "	2 1/2" " 2 3/4"	With "
For BX Cable or Loom	2 1/2" " 2 3/4"	With "
" Rigid Conduit	2 to 2 3/4"	Without "

SOLID GANG BOXES—GALVANIZED

Covers Extra		Price
2 Gang	3 Gang	4 Gang
Price of Box... \$.85	\$ 1.20	\$ 1.60
Price of Cover... .40	.60	.80

Black	Galvanized	Black	Galvd.
Loom, BX or Conduit	2 Gang	3 Gang	4 Gang
Tandem Boxes 1 1/2" & 2" Deep	\$.68	\$ 1.10	\$ 1.68
" 2 1/2" & 2 3/4" "	.81	1.23	1.90

DOOR SWITCH BOXES

Black	Galvd.
For Rigid or Flexible Conduit without Clamps	\$.50
" " " with Clamps	.60

LAUNDRY BOXES

Black	Galvd.
Gem-Appleton or Raco, etc., with Single Receptacle	\$1.10 \$1.25
" " " " Duplex	1.25 1.35

For Concrete Boxes See Page PL-5.

For Solid Gang Boxes See Page PL-5.

BOXES & COVERS, OUTLET

CEILING BOXES, ROUND

Universal	Knockouts	Price
Nos.	Size and Description	Depth Bottom Side Black Galvd.
36115	3 1/2" With Lugs	2 1/2" 3 1/2" & 4 Loom
36116	3 1/2" No	2 1/2" 3 1/2" & 4 "
36125	3 1/2" With	2 1/2" 3 1/2" & 4 "
36126	3 1/2" No	2 1/2" 3 1/2" & 4 "
36716	3 1/2" Flat Plate with Clamps	2 1/2" 3 1/2" or 4" K.O.
56111	4" With Ears	2 1/2" 3 1/2" or 4" K.O.
56112	4" No	2 1/2" 3 1/2" or 4" K.O.
56115	4" With Ears-Loom & Cond.	2 1/2" 3 1/2" & 6 Loom
56116	4" No	2 1/2" 3 1/2" or 4" K.O.
56121	4" With Ears	2 1/2" 3 1/2" or 4" K.O.
56122	4" No Ears	2 1/2" 3 1/2" or 4" K.O.
56125	4" Ears-Loom & Conduit	2 1/2" 3 1/2" & 6 Loom
56126	4" No Ears	2 1/2" 3 1/2" or 4" K.O.
56712	4" Flat Plate	2 1/2" or 4" K.O.

OUTLET BOXES, OCTAGON

Universal	Knockouts	Price
24151	3 1/2" Conduit Box	1 1/2" 2 1/2" 3 1/2" Black \$11.11 \$10.13
24151	3 1/2" "	1 1/2" 2 1/2" 3 1/2" .13 .15
24151FS3	4" With Stud	1 1/2" 2 1/2" 3 1/2" .21 .23
54151	4" Conduit Box	1 1/2" 2 1/2" 3 1/2" .14 .17
54151	4" "	1 1/2" 2 1/2" 3 1/2" .16 .18
54151FS4	4" With Stud	1 1/2" 2 1/2" 3 1/2" .16 .18
54151FS4	4" Cond. & Loom B.	1 1/2" 2 1/2" 3 1/2" .21 .24
54171	4" Conduit Box	2 1/2" 3 1/2" 4 1/2" .26 .30

Boxes & Covers

COVERS
For Octagon or Round Boxes

		Black	Galvd.
24C-1	3 1/2" Blank Cover, Flat.....	\$0.05	\$0.08
24C-3	3 1/2" Flat.....	.06	.08
24C-5	3 1/2" Flat.....	.06	.08
24C-7	3 1/2" Raised.....	.07	.09
24C-12	3 1/2" Raised Drop Cover with 1/2" Metal Bushing.....	.07	.09
24C-28	3 1/2" Spider Cover for Switch or Receptacle.....	.08	.10
24C-30	3 1/2" Raised Federal Sign.....	.07	.09
24C-33	3 1/2" Flat.....	.20	.22
24C-35 & 36	3 1/2" Raised 1 1/2" hole for other.....	.07	.09
24C-39	3 1/2" Flat for fluted devices.....	.18	.20
54C-1	4" Blank Flat.....	.06	.09
54C-2	4" Raised.....	.07	.10
54C-4	4" Raised Open 5/8" Deep.....	.10	.12
54C-6	4" Flat with 1/2" K. O. in Center.....	.10	.10
54C-7	4" Raised 1 1/2" K. O. in Center.....	.10	.10
54C-12	4" Raised Drop 1 1/2" K. O. in Center.....	.09	.11
54C-28	4" Spider for Switch or Receptacle.....	.09	.11
54C-31	4" Raised Federal Sign.....	.08	.11
54C-33	4" Flat 1 1/2" Hole for Std. ....	.11	.13
54C-35-6	4" Raised 1 1/2" King.....	.08	.11
54C-39	4" Flat for Fluted Devices.....	.20	.22
54C-48	4" Raised 1 1/2" High Open Plaster Ring.....	.08	.11

OUTLET BOXES—Square

Uni. versal No.	Size and Description	Depth	Knockouts	Price
51151	4" Sq. Comb. Gas & Elect.....	1 1/2"	5 1/2" 8 1/2"	\$0.17 \$0.20
51151	4" Sq. Gas & Elect.....	1 1/2"	5 1/2" 8 1/2"	.19 .22
52151	4" Conduit Box.....	1 1/2"	5 1/2" 10 1/2"	.17 .20
52151	4" Conduit Box.....	2 1/2"	5 1/2" 10 1/2"	.19 .23
52171	4" Conduit Box.....	2 1/2"	5 1/2" 10 1/2"	.56
72151	4 1/2" Conduit Box.....	1 1/2"	12 1/2" 12 1/2"	.43
72171	4 1/2" Conduit Box.....	2 1/2"	12 1/2" 12 1/2"	.51

COVERS For Square Boxes

		Black	Galvd.
52C-1	4" Sq. Blank Flat.....	\$0.08	\$0.11
52C-2	4" Raised.....	.11	.14
52C-3	4" Raised 1/2" High Open Plaster Ring.....	.14	.16
52C-6	4" Flat with 1/2" K. O. in Center.....	.11	.13
52C-7	4" Raised Drop with 1/2" K. O. in Center.....	.15	.18
52C-12	4" Flat with 1/2" K. O. in Center.....	.13	.15
52C-13	4" 1/2" for Switch or Recept.....	.11	.13
52C-14	4" 1/2" for French Fixtures.....	.12	.14
52C-15	4" 1/2" for French Fixtures.....	.17	.20
52C-16	4" 1/2" for French Fixtures.....	.19	.22
52C-17	4" 1/2" for French Fixtures.....	.16	.19
52C-18	4" 1/2" for French Fixtures.....	.17	.20
52C-19	4" 1/2" for French Fixtures.....	.22	.24
52C-21	4" 1/2" for French Fixtures.....	.24	.26
52C-25	4" Flat Spider for Snap Switches.....	.17	.19
52C-31	4" Raised for Sign Recept.....	.10	.11
52C-35-36	4" Fluted Devices.....	.15	.18
52C-39	4" with 2 1/2" Opening Plaster Ring.....	.27	.30
52C-45	4" with 2 1/2" Opening Plaster Ring.....	.12	.14
52C-57	4" For French Fixtures.....	.33	.36
52C-62	4" Single Sq. 1/2" High.....	.10	.13
72C-1	4 1/2" Sq. Blank Flat.....	.28	
72C-2	4 1/2" Raised Open.....	.32	
72C-3	4 1/2" Raised Open.....	.35	
72C-4	4 1/2" with 1/2" K. O. in Center.....	.35	
72C-12	4 1/2" Drop 1/2" Bushing.....	.35	
72C-14-15	4 1/2" 1/2" & 1" for Switch or Recept.....	.37	
72C-18	4 1/2" 1/2" & 1" for 2 Devices.....	.50	
72C-48	4 1/2" Open 1/2" High.....	.35	
Special 1	4" Cover for One Push or Toggle Switch or Single Cover.....	.22	.27
For Red	4" Cover Two Push or Toggle Switches or Two Receptacles or Any Combination of Two Devices.....	.36	.40
For Seal Work	4" Cover for One Push or Toggle Switch or Single Cover.....		

EXTENSION RINGS For Octagon & Square Boxes

		Black	Galvd.
25151	3 1/2" Octagon Ring 1 1/2" Deep.....	\$0.23	\$0.25
	3 1/2" Octagon Ring 1 1/2" Deep.....	.25	.28
73151	4 1/2" Square Ring 1 1/2" Deep.....	.59	
55171	4" Octagon Ring 2 1/2" Deep.....	.43	.48
53171	4" Square Ring 2 1/2".....	.70	
73171	4 1/2" Square Ring 2 1/2".....	.65	

HANDY OR UTILITY BOXES & COVERS
For Use With Rigid Conduit

Description	Universal Numbers	Price
Box 3 1/2" x 1 1/2" x 1 1/2" For Rigid Conduit.....	58151	\$0.22
Box 4 1/2" x 1 1/2" x 1 1/2" For Rigid Conduit.....	58861	.24
Box 4 1/2" x 1 1/2" x 1 1/2" For Rigid Conduit.....	58862	.22
Box 4 1/2" x 1 1/2" x 1 1/2" For Rigid Conduit.....	58871	.22
Cover Flat Steel Closed.....	58C1	.10
Cover Porcelain with Holes.....	58C2	.13
Cover Raised for Flush Plug Recept.....	58C3	.30
Cover for Sgle. Receptacle.....	58C5	.19
Cover for Duplex Receptacle.....	58C7	.19
Cover for Toggle Flush Switch.....	58C80	.19
Cover for Sgle. Push Switch.....	58C83	.19
Cover for Sign Receptacle.....	58C88	.18
Cover for Snap Switches.....	58C88	.18
Cover with 1/2" K. O.	58C8	.16
Cover with 1/2" or 3/8" Nipple.....	58C11	.27
Cover with Bushing for Cord.....	58C11	.16

CONCRETE BOXES—Galvanized Only

	Depth	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	5"	6"	7"	8"
Box & Back Plate with 1/2" Stud.....	\$0.290	\$3.30	\$6.00	\$10.00	\$13.00	\$17.00	\$20.00	\$23.00	\$26.00	\$29.00	\$32.00
Box & Back Plate less 1/2" Stud.....	.25	.30	.32	.35	.39	.42	.51	.60			
Plate only 4 1/2" Dia. without Fixture Stud 3 1/2" and 2 1/2" K. O.							\$0.11				
Plate only 4 1/2" Dia. with 1/2" Fixture Stud 3 1/2" and 2 1/2" K. O. ....							.16				
Plate only 4 1/2" Dia. with 1/2" Fixture Stud 3 1/2" and 2 1/2" K. O. ....							.20				

SOLID GANG BOXES

Covers	Extra
Galvd. Only	
2 Gang	3 Gang
Box Price.....	\$8.85 \$1.20 \$1.60
Cover	.40 .60 .80
	1.00 1.95 3.45
	3.85 3.85 3.85

These prices apply only to the United States

Electrical Contracting, March, 1932

41

BOXES, OUTLET

NEW CODE OUTLET BOXES

Size	Stud	Clamps	Bush	Plates	Price
3 1/2" x 3 1/2"	Round	Yes	Two	No	\$0.23
3 1/2" x 3 1/2"	Round	No	Two	No	.23
3 1/2" x 3 1/2"	Round	Yes	Two	Two	.27
3 1/2" x 3 1/2"	Octagon	No	Two	Two	.16
3 1/2" x 3 1/2"	Octagon	Yes	Two	Two	.20
3 1/2" x 3 1/2"	Octagon	No	Two	Two	.23
3 1/2" x 3 1/2"	Octagon	Yes	Two	Two	.27
4 1/2" x 4 1/2"	Octagon	No	Two	Two	.24
4 1/2" x 4 1/2"	Octagon	Yes	Two	Two	.24
4 1/2" x 4 1/2"	Octagon	No	Two	Two	.24
4 1/2" x 4 1/2"	Octagon	Yes	Two	Two	.24
G.E. Cable Boxes for Straight Electric or Combination No. 5200-01.....					
G.E. Cable Boxes for Straight Electric or Combination No. 5200-01.....					
Straight Box 18" Long.....					
Straight Box 24" Long.....					
Shallow Office Box 19 1/2" Long.....					
Shallow Offset Box 24" Long.....					
Deep Offset Box 19 1/2" Long.....					
Deep Offset Box 24" Long.....					
Straight Old Work Bar 12".....					
Box Cleat Bar 21".....					
Straight Saddle Bar.....					

BAR HANGERS FOR OUTLET BOXES

Boxes Extra

(With 1/2" Fixture Stud) (With 1/2" Stud add 5c ea.)	Price
Straight Bar 18" Long.....	\$0.22
Straight Bar 24" Long.....	.26
Shallow Office Bar 19 1/2" Long.....	.33
Shallow Offset Bar 24" Long.....	.26
Deep Offset Bar 19 1/2" Long.....	.35
Deep Offset Bar 24" Long.....	.35
Straight Old Work Bar 12".....	.15
Box Cleat Bar 21".....	.12
Straight Saddle Bar.....	.20

SET-UP BOXES WITH BARS

For Loom

Size	Ears	Clamps	Bush	Plates	Price
3 1/2" x 3 1/2" Round	No	None	None	None	\$0.30
3 1/2" x 3 1/2" Round	No	Two	None	None	.35
3 1/2" x 3 1/2" Round	Yes	None	None	None	.35
3 1/2" x 3 1/2" Round	Yes	Two	None	None	.40
For New Code Boxes					
3 1/2" x 1 1/2" Oct.	Yes	Two	None	None	.45
3 1/2" x 1 1/2" Oct.	Yes	Two	Two	Two	.50
3 1/2" x 1 1/2" Round	No	Two	None	None	.45
3 1/2" x 1 1/2" Round	No	Two	Two	Two	.45
3 1/2" x 1 1/2" Oct.	Yes	Two	None	None	.50
4 1/2" Round	No	None	None	None	.30
4 1/2" Round	Yes	None	None	None	.35

BUSHINGS & LOCKNUTS

For Rigid Conduit

Cat. No.	K. O.	Inside Size	Outside Size	Wire Size	Bushing Each	Extra Ring Each
A-1	1/2"	1/2"	1 1/2"	No. 10	\$.08	\$.04
A-1 1/2	1 1/2"	1 1/2"	1 1/2"	No. 10	.10	.06
A-2	2"	2"	2"	No. 8	.10	.06
A-3	2 1/2"	2 1/2"	2 1/2"	1	.12	.06
A-4	3"	3"	3"	No. 0	.15	.07
A-5	3 1/2"	3 1/2"	3 1/2"	1 1/2" 450 CM	.22	.10
A-6	4"	4"	4"	1 Mill. CM	.45	.12
B-1	1 1/2"	1 1/2"	1 1/2"	No. 10	.20	.06
K-1	1 1/2"	1 1/2"	1 1/2"	No. 10	.32	.06
K-2	2"	2"	2"	No. 8	.37	.06
20						
30	1 1/2"	1 1/2"	1 1/2"	No. 2 B & S	.12	
40	2"	2"	2"	00	.20	
50	2 1/2"	2 1/2"	2 1/2"	350.000	.30	
55	3"	3"	3"	600.000	.38	
60	3 1/2"	3 1/2"	3 1/2			

THREADED COMPOSITION BUSHINGS

For Entrance, Cut-outs and Panel Boxes

	Size	1/4"	3/8"	1"	1 1/4"	2"	2 1/2"	3"
Without Locknut.....	8.05	\$1.11	\$1.12	\$1.14	\$1.16	\$1.30	\$1.45	\$1.80
With Locknut.....	.....	.....	.....	.....	.....	.....	.....	.....

Socket Bushings

	Size	1/4"	3/8"	1"	1 1/4"	2"
Black Composition.....
For Sockets.....

BOXES, FLOOR

NON-ADJUSTABLE TYPE

Lathrope	R. & S.	Steel City	Description	Price
Fuliman	Russell	Steel	Comp. Out. Less Std. Recep. with Stem Nozzle	\$3.70
Mfg. Co.	& Stoll	City Co.	.....	.....
100	2500	400	.....	.....
101	2500	400	.....	2.70
110	2500	477	.....	4.10
112	2581	493	.....	5.60
113	2581	491	.....	5.80
300	.....	499	20A Polarz Recep. and Plug	2.50
			Midget Out. with 10A Recep. no Nozzle	2.50

ADJUSTABLE TYPE

140	2502	400	Complete—Standard Box—Less Receptacle	\$5.35
150	2503	401	.....	5.35
120	.....	401	.....	5.35
130	.....	401	.....	5.70

ADJUSTABLE GANG TYPE

251	2511	441	Sgl. Gang Less Recep. with 1/4" Cov. Plate	\$6.75
252	2512	442	Two	13.20
253	2513	443	Three	19.45
254	2514	444	Four	25.00
255	2515	445	Five	32.00
256	2516	446	Six	38.40

NOZZLES

For All Types of Floor Boxes

283	2696	460	For Duplex Tel. with 1/2" Brass Pipe	\$4.35
284	2696	468	.....	5.70
285	2644	468B	Dble. Duplex Recept. with 1/2" Brass Pipe	9.10
274	2617	.....	3" High with Wire Slot & Screw Cap	2.30
295	.....	2617	For Duplex Recept. with 1/2" Brass Pipe	8.25
206	2557	467	Standard Stem Nozzle	1.15
207	2558	466	Bell	1.15
270	.....	2558	Stem Nozzle for Armored Cable	1.15
271	2617	.....	Bell	1.65
272	1945	.....	Stem	1.90
280	.....	2617	.....	4.10
			Single Recept. Nozzle	

G. E. & T & B BOXES

G. E.	T. & B.	Description	Price
8000	8000	Utility Outlet Box Non-Adjustable.	\$1.00
8200	1700	Two Wire Flg.	4.00
8220-40	1701-2	Three	5.50
8300	1703	Extension	2.75
8400	1730-60	Two Wire	6.25
8420-40	1731-61-2	Three	7.25
8500	1733-63	Telo. or Signal Floor Box Adj.—Deep or Shallow...	5.00

"BUSHED ELBOWS"—"BULB TEES"—
FLOOR COUPLINGS

Bushed Elbows Iron.....	\$0.60	\$0.80	\$1.15	\$3.45
"Bulb" Tees.....	.....	1.75	2.60	6.95
Floor Coupling Brass.....	1.40	1.65	2.00	4.35

BOXES, CUTOUT

TYPE "A" STEEL SURFACE CUTOUT BOXES

Black

Width Length.	3"	4"	6"	Short	Length	3"	4"	6"
Short	Side	Deep	Deep	Side	Side	Deep	Deep	Deep
414	5	\$.55	.....	12	30	\$.75	\$.90	\$ 1.10
414	9	.65	.....	15	15	2.50	3.05	3.50
414	9	3 1/2"	.60	15	18	3.05	3.50	4.25
6	6	.60	\$.80	15	24	4.15	5.25	6.25
6	8	.75	.85	31.05	30	9.75	11.30	13.00
6	9	.80	.90	16.00	18	3.85	4.40	5.00
6	12	1.10	1.15	18	21	7.85	9.15	10.50
8	8	.95	1.05	14.00	18	24	11.20	12.65
8	10	1.15	1.20	18	30	12.80	14.90	17.00
8	12	1.35	1.40	2.00	18	36	13.50	15.50
9	9	1.05	1.45	2.70	18	40	14.00	16.00
9	12	1.40	1.75	2.20	24	24	10.20	11.70
10	10	1.35	1.40	2.10	24	30	14.00	16.10
10	12	1.55	1.65	2.30	24	36	14.70	20.20
10	15	1.80	1.90	2.65	24	40	15.50	21.00
10	18	2.10	2.20	3.05	24	44	24.25	26.60
12	12	1.80	1.90	2.65	30	30	20.00	21.75
12	15	2.15	2.55	30	36	27.10	30.35	33.00
12	18	2.40	3.65	30	42	28.65	31.05	34.25
12	24	4.10	5.05	30	48	36.50	39.25	42.50

For Galvanized Boxes Add 25% to above prices.

BELLS & BUZZERS

Ansonia

Name	No.	Description	Buzzer	2 1/4"	3"	4"	5"	6"	7"	8"	10"	12"
Ansonia	656	Sgl. Coil Non Adjust.	\$.40	\$.45	.....	.....	.....	.....	.....	.....	.....	.....
Ansonia	657	Dble. Coil Non Adjust.	.50	.55	\$.60	.....	.....	.....	.....	.....	.....	.....
Wizard	659	Dble. Coil Non Adjust.	.90	.95	1.05	\$1.35	\$1.65	.....	.....	.....	.....	.....
Eureka	641	Dble. Coil Adjust. Class	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acme	631	Dble. Coil Adjust. Class	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Eureka	621	Dble. Wood Box Bell	1.20	1.35	1.40	1.50	1.60	1.80	2.10	2.40	2.70	3.10
Monitor	661	Round Type Monitor Bell	.....	.....	1.50	.....	.....	.....	.....	.....	.....	.....
Wizard	666	Watch Case Buzzer Round	1.25	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ansonia	663	Comb. Bell & Buzzer	1.00	1.00	1.10	.....	.....	.....	.....	.....	.....	.....
Ansonia	664	Comb. Bell & Buzzer	.....	1.15	.....	.....	.....	.....	.....	.....	.....	.....

* These prices apply only to the United States

BELLS AND BUZZERS—Continued

Skeleton and Weatherproof Bells

Size	2 1/4"	3"	4"	5"	6"	7"	8"	10"	12"
620 D.C. Skeleton	\$4.55	\$5.00	\$5.75	\$7.00	\$8.75	\$12.35	\$13.20	\$20.60	.....
622 D.C. Weatherprf.	.....	.....	.....	.....	.....	13.00	14.65	18.15	30.30
624 Wthpl. Trans. Bell	.....	.....	.....	.....	.....	16.30	17.95	21.85	42.30

Edwards

Name	No.	Size	Description	Price
Nubel	735	2 1/4"	Two Coil Non-Adjust.—Gray Enam. Bell	\$.65
	736	2 1/4"	.....	.60
Dizie	720	2 1/4"	Class C Non-Adjust. Bell	.95
	725	2 1/4"	.....	.90
Combell	737	2 1/4"	Two Coil Non-Adjust.—Gray Enam. Bell & Buzzer	1.15
Tubell	738	2 1/4"	Dble. Coil Non-Adjust.—Gray Enam. Two Bells	1.20
Cadet	710	2 1/4"	Two Coil-Class B-Adjust. Bell	1.00
	715	2 1/4"	.....	.95
	712	2 1/4"	.....	1.25
	714	2 1/4"	.....	1.60
Buz-A-Bell	730	2 1/4"	Two-Coil-Class C Comb. Bell & Buzzer	1.20
Monitor	156	3"	Monitor Bell—Nickel Plated Gong	1.60
Bronz	750	3"	Nickel Watch Case Buzzer	1.25
Buzzer	16	.....	Flush Buzzer fits Standard Switch Box	2.40

Skeleton D. C. & Transformer Inside Bells & Buzzers

Size	3"	4"	6"	8"	10"	12"
17 "Economy" Skelet. Bells	\$5.50	\$6.75	\$8.75	\$14.25	\$21.25	\$27.50

150 A. C. Transformer	9.40	10.15	18.90	23.45	41.90	48.00	\$7.00
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Edwards—Lungen

Size	1"	1 1/4"	2 1/4"	3"	4"	6"	8"</
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Push Buttons, Etc.

PUSH BUTTONS, TREADS, SPRINGS

STANDARD PUSHES AND TREADS

Description	Price
Round 1 1/4" and 1 1/4" Stamped Brass.	.25
Round 2 1/4" Stamped Brass.	.40
Round 2 1/4" with Card Holder Stamped Brass.	.40
Rectangular 4x2" Stamped Brass.	.40
Rectangular 3 1/4x1 1/4" Stamped Brass.	.40
Oval 2 1/4" 1 1/4" Stamped Brass.	.30
Oval 4 1/2" Stamped Brass.	.45
Pear Push Buttons—Wood or Composition.	.60
Pear Push Buttons—Metal, Nickel or Brass.	.85
Desk Buttons—1/4" Hole—Nickel.	.75
Desk Buttons—1/4" Hole—Nickel.	.65
Desk Buttons—1/4" Hole—Nickel.	.45
High Voltage 1/4" Hole—110 Volts.	2.40
Table Clamp with Push Button.	1.00
Floor Treads—“Daisy” “Dixie”.	.85
Floor Treads—“Daisy” “Dixie”.	1.50
Wood Push Buttons.	.20

BAKELITE OR COMPOSITION PUSHES

Round Plain 1 1/4" Diam.	\$.30	Rectangular Plain 1 1/4x3 1/4".	\$.40
Octagon Fancy 1 1/4x1 1/4" Diam.	.35	Rectangular Fancy 1 1/4x3 1/4".	.60
Oct. Card Holder 2 1/2x2 1/4" Diam.	.40	Rec. Double Card Holder.	.85

DESK PUSHES—COMPOUND

With Buttons

Make and Description	1	2	3	4	5	6
Edw. #146-Bakelite Block.	\$2.10	\$2.50	\$3.20	\$3.65	\$4.50	\$5.25
Edw. #197 Less Cord Bakelite Bl.	3.50	4.75	6.00	7.25	8.50	9.75
Edw. #197 with 6' Cord Bakelite Bl.	4.05	6.10	7.75	9.45	11.15	12.85
Edw. #190 Wood—Less Cord.	4.00	5.35	6.60	8.10	9.40	10.80
Edw. #190 Wood with Cord.	4.45	6.65	8.35	10.30	12.05	13.90
Fara. #4C Wood Less Cord.	2.00	2.30	2.60	3.00	3.50	3.90
Fara. #2A Wood Less Cord.	4.90	7.00	8.50	10.60	12.40	13.80
Fara. B.D.P. Bakelite Less Cord.	3.50	4.75	6.00	7.25	8.50	9.75
Fara. M. D. P. All Metal Less Cord.	6.00	11.00	16.00	21.00	—	—
P&W #4 Wood Less Cord.	2.60	2.80	3.50	4.30	4.85	5.60
P&W #5 Wood Angle Less Cord.	—	—	—	—	—	—
P&W #12 Wood Less Cord.	3.30	4.25	5.45	—	—	6.00

DOOR AND WINDOW SPRINGS

	Door Springs	Window Springs	
Open Circuit Door Spring.	\$.40	Open Circuit Single.	\$.60
Closed Circuit Door Spring.	.50	Open Circuit Double.	.85
Open Circuit Make and Break.	.50	Close Circuit Single.	1.00
Open Circuit Door Trip.	1.00	Open Circuit Transom.	1.60

OTHER PUSH BUTTONS

Ansonia

Round Stamped	Price	Round Cast	Price
514 1 1/4" Loose Back.	\$.30	511 1 1/4" Loose Back.	\$.90
515 2 1/4" Loose Back.	.40	512 2 1/4" Loose Back.	1.00
579 1 1/4" Flush Push.	1.00	508-10 2 1/4" Loose Back.	1.00
E33 1 1/4" Flush Push.	1.00	540 2 1/4" Loose Back.	.60
		550 2 1/4" Loose Back.	.85
		570 2 1/4" Loose Back.	.75
F-33 Stamped Flush Push.	\$.70	545 Oblong 2 Gang for Cards.	1.85
G-33 Stamped Diamond Push.	.70	545 Oblong 4 Gang for Cards.	2.65
521 Stamped Push.	.75	545 Oblong 4 Gang for Cards.	3.65
528-534 Stamped Push.	.95	546 Oblong 1 Gang.	1.65
536-537 Stamped Push Loose Back.	.95	547 Oblong 2 Gang.	1.50
538 Stamped Oblong Push.	1.00	548 Oblong 1 Gang.	.75
541 Oblong for Card.	.65	549 Oblong 1 Gang.	1.20
544 Oblong for Card.	1.20	578 Diamond Push.	.70
Combination Floor Pushes Complete 573.	2.50		
700 1 Point Wood Base Switch.	.45		

Edwards

Round Desk Buttons	Oblong Push Buttons
621—1 1/4" Hole.	\$.10
622—1 1/4" Hole.	1.45
625—1 1/4" Hole.	.50
1786—2 1/4" Watertight.	3.00
	650—Single Solid Cast Brass.

Partrick & Wilkins

Round Push Buttons

Stained Wood Push #3.	\$.15
Oak Wood Regular #1.	.35
Oak Open, Closed and Dbl. Cont. #1.	.65
Oak Triple Contact #1.	.90
Cast Brass 1 1/4" Diam. #8.	.55
Cast Brass 2 1/4" Diam. #9.	.65

Oblong Pushes

15 Cast Brass 4 1/4x1 1/4" Screw Cap.	\$.15
31 Cast Brass 5x2 1/4" Screw Cap.	2.15
44 Cast Brass 4x2" Screw Cap.	1.40
708 Wrought Push and Speak 1 Pce.	1.00
907 2 Button and Card Holder.	2.15
908 3 Button and Card Holder.	2.95
909 4 Button and Card Holder.	4.55

Desk Push Buttons

Car Push 1/4" Hole Black Center.	\$.45
Multiple 1/4" Hole Black Center.	1.35
Pony R. C. 1/4" Hole Black Center.	1.85

Pear Shape Pushes

Compound Maple 2 Button.	\$.20
Compound Maple 3 Button.	3.00
Wood Rosettes for above.	.40

These prices apply only to the United States

Brackets, Racks and Wireholders

MULTIPLE PUSH BUTTONS

Couch "Pushrites"

With Card Holders

Number of Buttons	Plain Base Number	Wood Base Price	Weighted Base Number	Flush Brass Price	Plate Type Number	Price
4	7900	\$ 3.35	7980	\$ 3.75	7940	\$ 5.00
6	740	4.60	788	5.20		
8	7910	5.80	7990	6.65	7950	9.15
12	7921	8.30	79010	9.60	7960	13.30
16	7930	10.80	79020	12.45	7970	17.50
20	793	13.30	7902	15.40	797	21.60

COUCH UNMOUNTED PUSH BUTTONS "WORKRITES"

No. 97 for 1/2" Hole.	\$.50
Adaptor No. 0684 for same.	.05

BRACKETS, RACKS AND WIREHOLDERS

Findlay—G. E.—Hubbard—Joslyn and National

HOUSE BRACKETS

For Pin Type Insulators, Less Insulators

Description	No. of Wires	Spacing	Price	Description	No. of Wires	Spacing	Price
Light Type	One	6 1/2"	\$.25	Light Type	One	6 1/2"	\$.30
Light Type	Two	6 1/2"	.55	Light Type	Two	6 1/2"	.55
Light Type	Three	6 1/2"	.90	Light Type	Three	6 1/2"	.90
Heavy Type	One	4 1/2"	.40	Heavy Type	One	4 1/2"	.40
Heavy Type	Two	4 1/2"	.80	Heavy Type	Two	4 1/2"	.80
Heavy Type	Three	4 1/2"	1.10	Heavy Type	Three	4 1/2"	1.10

HOUSE RACKS

With Insulators Attached

One	\$.40	Two	4"	\$1.10
Four	.95		5"	1.65
Light Type	Two	6"	.80	1.75
Light Type	Three	3"	.95	2.10
Light Type	Four	6"	1.20	2.20
Light Type	Five	4"	.90	2.70

WIREHOLDERS

Separable Base With Insulator

Light Type	Two	6"	\$.55	Light Type	Three	4 1/2"	\$.80
Light Type	Three	6"	.60	Light Type	Four	5"	.85

WIREHOLDERS

With Insulators Attached

One	\$.30	Two	6"	\$1.30
Light Type	Two	6"	.55	1.25
Light Type	Three	6"	.55	1.30
Light Type	Four	6"	.80	1.85
Light Type	Five	6"	.85	1.05

SPOOL INSULATORS

All Porcelain For Secondary Racks

2"	2 1/2"	3"	3 1/2"	4"	4 1/2"	5"	6"	7"	8"	9"	10"	11"	12"	13"	14"	15"	16"	17"	18"	19"	20"
2"	2 1/2"	3"	3 1/2"	4"	4 1/2"	5"	6"	7"	8"	9"	10"	11"	12"	13"	14"	15"	16"	17"	18"	19"	20"
2 1/2"	3 1/2"	4 1/2"	5 1/2"	6 1/2"	7 1/2"	8 1/2"	9 1/2"	10 1/2"	11 1/2"	12 1/2"	13 1/2"	14 1/2"	15 1/2"	16 1/2"	17 1/2"	18 1/2"	19 1/2"	20 1/2"	21 1/2"	22 1/2"	23 1/2"
3 1/2"	4 1/2"	5 1/2"	6 1/2"	7 1/2"	8 1/2"	9 1/2"	10 1/2"	11 1/2"	12 1/2"	13 1/2"	14 1/2"	15 1/2"	16 1/2"	17 1/2"	18 1/2"	19 1/2"	20 1/2"	21 1/2"	22 1/2"	23 1/2"	24 1/2"
4 1/2"	5 1/2"	6 1/2"	7 1/2"	8 1/2"	9 1/2"	10 1/2"	11 1/2"	12 1/2"	13 1/2"	14 1/2"	15 1/2"	16 1/2"	17 1/2"	18 1/2"	19 1/2"	20 1/2"	21 1/2"	22 1/2"	23 1/2"	24 1/2"	25 1/

Conduit

THIN WALL CONDUIT

	1/8"	3/16"	1"	1 1/8"	1 1/4"	2"
Threadless.....	Per Foot	\$0.07	\$0.03	\$0.12	\$0.15	\$0.17
Adaptor Wp.....	Each	.10	.15	.26	.65	.85
Couplings or Conn.....		.12	.18	.30	.65	.85
Elbowless Coupling.....				.50	.60	1.30

NOTE—No Coupling is included in the above thin wall prices.

ELBOWS OR BENDS, COUPLINGS, OR UNIONS,
BUSHINGS, LOCKNUTS, REDUCERS .

Price Each

Size	Each	Bends or Elbows		Couplings		Bushings		Locknut		Erickson Coupl. or Unions	
		Black	Galv.	Black	Galv.	Galv.	Galv.	Galv.	Galv.	Galv.	Reducers
1/8"		\$.15	\$.17	\$.09	\$.10	\$.01 1/2	\$.01	\$.30	\$.20		
1/4"		.19	.23	.14	.17	.05	.05	.40	.26		
5/16"		.29	.34	.17	.19	.05	.05	.40	.26		
3/8"		.41	.46	.24	.26	.07	.04 1/2	.50	.40		
7/16"		.55	.62	.30	.33	.07	.07	.50	.53		
1/2"		.88	1.00	.40	.44	.16	.11	.30	.66		
9/16"		1.45	1.66	.58	.51	.23	.17	.50	1.24		
5/8"		2.80	4.33	.76	.82	.35	.28	.50	1.67		
11/16"		8.30	9.54	1.00	1.10	.67	.53	—	2.48		
3/4"		9.15	11.00	1.27	1.37	1.10	.60	—	—		

Also on Page PL-10.

Also on

Page

PL-5

Also on

Page

PL-12

CONDUIT PENNIES

Size	Size	Price
1/8"	2"	\$0.01
1/4"	2 1/2"	.01
5/16"	3"	.01 1/2
3/8"	3 1/2"	.02
7/16"	4"	.03

FLEXIBLE METALLIC CONDUIT
"Greenfield", "Flexsteel", or Similar

Single Strip Per Foot.....	5/8"	3/4"	1 1/8"	1 1/4"	1 1/2"	2"
Double Strip Per Foot.....	\$.00	\$.12	\$.14	\$.19	\$.40	\$.45
For Fittings for Metallic Conduit See Page PL-14.						
For Non-Metallic Conduit or Loom See Page PL-15.						
For Steel Armored Cable & Lead Covered See Next Item.						

RUNNING THREAD, PIPE

Price per Foot.....	3/8" & 1/2"	3/4"	1 1/8"	1 1/4"	1 1/2"	2"
	\$.25	\$.30	\$.45	\$.55		

CONDUIT WOOD PLUGS

Price Each.....	5/16"	3/4"	1"	1 1/8"	1 1/4"	2"
	\$.02	\$.03	\$.04	\$.08	\$.14	\$.22
For Pipe Straps, see Page PL-25. For Solder, Sticks, etc., Page PL-25.						

CABLE, ARMORED & NON-METALLIC SHEATHED

ARMORED CABLE, "BX", "ABC", "FLEXSTEEL", OR SIMILAR

TWO CONDUCTOR	Solid	Stranded	Price Per Foot		
			No. 14	No. 12	No. 10
THREE CONDUCTOR	Solid	Stranded	\$.06	\$.08	\$.10
FOUR CONDUCTOR	Solid	Stranded	\$.08	\$.10	\$.13
ONE CONDUCTOR	Solid	Stranded	\$.16	\$.20	\$.25
CONDUCTOR OVALFLEX	2 Conductor	Stranded	\$.09	\$.10	\$.11
	3 Conductor	Stranded	\$.06	\$.13	\$.20
			\$.13	\$.20	....
Price Per Foot			No. 8	No. 6	No. 4
No. 14			\$.17	\$.24	\$.38
No. 12					
No. 10					
Double Strip Armored Cable add 30% to above prices.					
Anti-Short Fibre Bushings for ABC Cable, Each.....					\$.02
Clips or Staples 3/8" for Armored or Non-Metallic Cable, Each.....					\$.01

ARMORED SERVICE ENTRANCE CABLE

Size—No 8	No 6	No 4	Per Foot
Two Conductor Stranded Service Cable.....	\$.24	\$.30	
Three Conductor Stranded Service Cable.....	.27	.34	\$.43

These prices apply only to the United States

"ABC" LEAD COVERED ARMORED CABLE

Size	Conductor	Solid Lead Covered	Stranded												
No. 14	1	\$.08	—	No. 12	1	\$.08	—	No. 10	1	\$.08	—	No. 8	1	\$.16	—
1	2	—	—	1	2	—	—	1	2	—	—	1	2	—	—
1	3	—	—	1	3	—	—	1	3	—	—	1	3	—	—
1	4	—	—	1	4	—	—	1	4	—	—	1	4	—	—

"ABC" ARMORED LAMP CORD

Size	Conductor	Solid Lead Covered	Stranded												
No. 8	1	\$.16	—	No. 6	1	\$.22	—	No. 4	1	\$.35	—	No. 2	1	\$.47	—
1	2	—	—	1	2	—	—	1	2	—	—	1	2	—	—
1	3	—	—	1	3	—	—	1	3	—	—	1	3	—	—
1	4	—	—	1	4	—	—	1	4	—	—	1	4	—	—

NON-METALLIC SHEATHED CABLE

"Romer", "Loomwire", "Wireflex", or similar

(With or Without Ground Wire)	#14	#12	#10	#8	#6	#4
2 Conductor per Foot.....	\$0.05	\$0.07	\$0.10	\$0.15	\$0.23	\$0.28
3 Conductor per Foot.....	.08	.10	.13	.20	.27	.43
Fitting-Straps Each.....	.01	.01	.01	.01	.01	.01
Fitting-Clips Each.....	.03	.03	.03	.03	.03	.03
Fitting-Connectors Each.....	.10	.10	.20	.20	.30	.55

CUTOUTS OR FUSE BLOCKS

PLUG CUTOUTS
30 Amp. Porcelain

Description	Price
Single Pole—Main Line.....	\$25.69
Double ".....	62.66
Triple ".....	121.65
Double Pole Single Branch.....	61.93
Double " Double ".....	62.87
Double " Single or Double Cross Branch.....	80.20
Triple to D. P. Double.....	80.20
Triple " Double ".....	80.20
Triple " Single ".....	80.20
Triple " Double ".....	80.20
Single Pole Main Line Cutout 600 Volt.....	80.20
250 Volt.....	31.60
Single Pole-Slate 250 V.....	80.20
600 Volt.....	80.20

Prices on cutouts do not include fuses

ENCLOSED CARTRIDGE CUTOUTS OR BASES	0-30	31-60	61-100
Porcelain Base, 250 Volts.....	\$.40	\$.65	\$1.20
Double " Main Line Enclosed Porcelain.....	.55	1.20	2.30
Triple " " ".....	.85	1.65	3.30
Double Pole Single Branch Porcelain.....	.75	1.60	....
Double " Double ".....	1.25	3.30	....
Triple to Double Pole Double Branch Porcelain.....	1.50	3.80	....
Triple Pole Single Branch Porcelain.....	1.30	3.00	....
Triple Pole Double Branch Porcelain.....	2.40	5.40	....
Single Pole Main Line Cutout 600 Volt.....	.70	1.00	1.80
250 Volt.....	31.60	80.20	80.20
Single Pole-Slate 250 V.....	80.20	80.20	80.20
600 Volt.....	80.20	80.20	80.20

C-SUNDRIES

GROUND CLAMPS

Standard Adjustable Ground Clamps, any make	3/8"	3/4"	5/8"	3/4"	5/8"
No. 3	\$.12	\$.15	\$.20	\$.25	\$.35
No. 4	\$.15	\$.20	\$.30	\$.40	\$.55
No. 5	\$.20	\$.30	\$.45	\$.60	\$.80

Blackburn.....

Other Types.....

Chase Shawmut 3660-68.....

G. V. A Series 5000.....

Galvnd. Straps, 2 Hole.....

CORD & WIRE CONNECTORS

SMALL FIXTURE & WIRE CONNECTORS
Solderless

Insulated Solderless Wire or Fixture Connectors Similar to "Ideal" "Marr" "Sherman" "Simplex" "S.R.K." "Wirelets" "Wiremold" Etc.—each \$0.02
E-Z or Simplex Insulated Solderless Wire or Fixture Connector.....03
Non-Insulated Solderless Wire Connectors—2 Screw—All Metal.....10

SET SCREW CONNECTORS

Round Brass

Wire Size	No.	No.	No.	No.	No.
	12-14	10	8	6	4
Divided Wall—2 Screws.....	\$0.12	\$0.12	\$0.15	\$0.17	\$0.20
" " 4 " ".....			.15	.18	.20
Hole Thru.....	2	.....	10	12	.18
" " 4 " ".....			.....	19	.....
Wire Size	No.	No.	No.	No.	No.
" " 2 " ".....	2	1/0	2/0	3/0	4/0
Divided Wall—2 Screws.....	\$0.23		\$0.28	\$0.35	\$0.62
Hole Thru.....	2	.....	.25	.....	.....
" " 4 " ".....			.22	.....	.....
Wire Size	No.	No.	No.	No.	No.
" " 4 " ".....	2	1/0	2/0	3/0	4/0
Hole Thru.....	2	.....	.30	.40	.50
" " 4 " ".....			.24	.....	.....

SOLDERLESS CONNECTORS
Dossert, Frankel or Penn-Union

Size Cond.	No.	No.	No.	No.	No.
2 Way L's.....	\$0.75	\$0.80	\$1.00	\$1.20	\$1.40
Cable Tape.....	1.05	1.20	1.40	1.75	2.10
3 Ways & Y's.....	1.05	1.20	1.40	1.75	2.10
Lugs FB Ang.....	.55	.60	.70	.90	1.10
	1.20	1.40	1.75	2.40	2.85
				3.75	4.65
					4.65
					2.40

CORD & MOTOR CONNECTORS

ARROW	Complete		Body Only		Cap Only No.	Price
	No.	Price	No.	Price		
Midget Arrotox	8239	\$1.00	8221	\$.55	RP	\$.10
Motor Conn.	RP-8221	.60	8221	\$.55	RP	\$.15
" "	RA-8222	.65	8222	\$.55	RA	\$.15
" "	RH-8224	1.20	8224	.75	RH	.45
" "	RG-8281	1.20	8281	.75	RG	.45
" "	RE-8335	1.60	8335	1.10	RE	.50
Bryant						
Motor Midget	KT-130	.70	130	.65	KT	.10
" Conn.	KG-103	.90	103	.65	KG	.30
" "	JX-5103	1.50	5103	1.00	JX	.55
GE						
Cord Conn.	1346-1347	.90	1347	.40	1346	.40
" "	1351	.....	1351	.55	2527	.10
" "	2715	1.25	2720	.95	2721	.35
" "	2715	.65	2716	.55	2717	.10
Hubbell						
Cord Connector	6116	.....	5574	.50	5806	.30
" "	6116	.75	6118	.65	5964	.10
" "	6160	.....	6630	.50	6631	.20
" "	6160	.80	6630	.50	6181	.10
" "	5518	.75	5574	.50	5420	.25
" "	5518	.....	7084	.85	7056	.55
" "	5518	.....	7091	1.10	7092	.75
" "	5518	.....	6409	1.00	6149	.55
Weber						
Cord Connector	2274	.60	.74	.45	2200	.20
Wirt						
Cord Connector	56	.....	55	.....	
NOTE: For Attachment Plugs and other caps—See Pages PL-16 & PL-17						

E-SUNDRIES

EXTENSION CORDS—MADE UP							
With Plug & Socket, but Guards-Lamps & Handles Extra							
With #18	With #18	With #18	With #18	With #18	With #18	With #18	With #18
Length Lamp Cord Reinforced Cord	With Artificial	With All Rubber Cord	and Weatherproof	Key Socket	Key Socket	Light	Heavy
in and Key	and Key Socket	Silk Cord and	and Weatherproof	Twist, or Parall.	Twist, or Parall.	Light	Heavy
Feet	Socket			#18	#16	#18	#16
5 Ft.	80.80	\$0.85	\$0.90	30.95	\$1.35	\$1.45	\$1.65
10 "	.90	1.00	1.05	1.00	1.20	1.65	1.85
15 "	1.00	1.15	1.20	1.15	1.45	1.95	2.25
20 "	1.10	1.30	1.35	1.30	1.70	2.25	2.85
25 "	1.20	1.45	1.50	1.45	1.95	2.55	3.05
						4.05	4.55
						6'4"	9'4"
						12'4"	15'4"
BELDEN	Flat Under-Rug.....			\$1.75	\$2.00	\$2.25	\$2.50
CUTLER	70129 Complete with Cord, Cap and Plug.....					\$1.75	
HAMMER	70131					1.35	

ELBOWS & BENDS
For Rigid Conduit

Size	1/2"	3/4"	1"	1 1/4"	1 1/2"
Black.....	\$1.15	\$1.19	\$1.20	\$1.41	\$1.55
Galv.....	.17	.23	.34	.46	.62
Size	2"	2 1/4"	3"	3 1/4"	4"
Black.....	\$1.88	\$1.45	\$3.90	\$8.30	\$9.15
Galv.....	1.00	1.66	4.33	9.54	11.00

These prices apply only to the United States

EXPANSION SHIELDS & ANCHORS

(Ackerman—Johnson—Chicago Expansion Bolt
—Diamond—Dryvin—Pactite—Paine—Star or Similar)

Screws Not Included.		Hammer Drive Anchors With Nail	
Expansive Screw Anchors or Caulking Anchors for Machine Screws or Bolts.	Size Screw or Bolt	Price	Size of Shield
6-32 Screw.....	6-32	\$0.06	1/8"
8-32 Screw.....	8-32	.07	1/8"
10-24 "	10-24	.08	1/8"
12-24 "	12-24	.10	1/8"
1-4x20 Bolt	1-4x20	.12	1/8"
5-16x18	5-16x18	.15	1/8"
3-8x16	3-8x16	.18	1/8"
7-16x14	7-16x14	.20	1/8"
1-2x13	1-2x13	.20	1/8"
5-8x13	5-8x13	.30	1/8"

Multi-Size Screw Anchors

Length of Anchor.....	5 to 10	8 to 14	16 to 20	20 to 25
Price Without Screw.....	\$0.04	\$0.05	\$0.06	\$0.08

LAG SCREW ANCHORS (Diamond or Similar)

Takes Lag Screw	3/16"	3/8"	5/16"	3/4"	1"
Price Without Lag Screw.....	\$1.15	\$1.18	\$1.25	\$1.35	\$1.50

FUSES

PLUG FUSES

Standard Plug Fuses—Any Make—\$.07 each or 5 for \$.35
(Some Manufacturers put these fuses up 4 in a box, in which case they should be retailed at 4 for \$.25.)

ENCLOSED FUSES, NON-RENEWABLE

Amps.	Non-Indicating		Indicating	
	Price Each	Price Each	Price Each	Price Each
250 Volts 600 Volts				
1 to 30	\$1.15	\$1.35	\$1.25	\$1.55
35 to 60	.25	.50	.40	.85
70 to 100	.50	1.15	1.25	1.85
110 to 200	1.55	1.95	2.30	3.10
225 to 400	2.75	4.20	4.50	6.80
450 to 600	4.25	6.15	6.80	9.90
650 to 800	8.90	11.15	13.85	17.35

RENEWABLE FUSES

Fuses

Amps.	Links	
	250 Volts	600 Volts
Size in Amps.....	14	14
Price Per Pound.....	\$60.00	\$6.50
Price Per Foot.....	.01	.01
Size in Amps.....	5	6
Price Per Pound.....	\$2.00	\$1.50
Price Per Foot.....	.01	.01
Size in Amps.....	10	15
Price Per Pound.....	\$1.00	\$1.00
Price Per Foot.....	.04	.04
Size in Amps.....	20	25
Price Per Pound.....	\$1.00	\$1.00
Price Per Foot.....	.04	.04
Size in Amps.....	70	75
Price Per Pound.....	\$1.00	\$1.00
Price Per Foot.....	.15	.20
Size in Amps.....	75	80
Price Per Pound.....	\$1.00	\$1.00
Price Per Foot.....	.21	.22
Fuse Strip Any Amperage.....	\$1.00 per lb.	

OPEN LINK FUSES

Small Wire Type

Size in Amps.	Amps.	
	35 to 60	65 to 100
Numbers.....	00-0-1-2-3	2-3-5
Price Each.....	\$1.12	\$1.16
Size in Amps.	25-100	110-200
Numbers.....	7	7 to 16
Price Each.....	\$8.33	\$8.30
Size in Amps.	225-400	400-800
Numbers.....	10 to 16	25
Price Each.....	\$1.10	\$1.85
Size in Amps.	800-1500	
Numbers.....		40
Price Each.....		\$6.95

STAMPED SHEET METAL LINK FUSES

Type of Link.....	B	C	D	E-F-H-I-L-M
C to C Distance.....	1/4	2 1/4	2 1/2	See Catalog
Price Each.....	\$1.11	\$1.11	\$1.16	\$0.90

DEVICES FOR J K SERIES

Lamp Receptacle S. H. Groove.....	80.59
" " " No S. H. Groove.....	.53
Plug Receptacle 10 & 15 Amp.....	.66
" " 20.....	.84
" " 10 " 3-wire.....	.92
Cord Rosette.....	.46
Blank Cast Cover.....	.40

SERIES V VAPORPROOF TYPE

Adapti Crouse-Hinds or Similar

Prices include Globe & Guard

		Form 75
V-VA & VDA as above	.....	\$5.60
VC & VL	" "	5.70
VE-VG & VT "	" "	5.90
VX	" "	6.00
VF	" "	6.10
VD & VJ	.....	6.40
		Form 200
V-VA & VDA as above	.....	\$6.70
VC & VL	" "	6.80
VE-VG & VT "	" "	6.80
VX	" "	7.05
VF	" "	7.15
VD & VJ	.....	7.35

ACCESSORIES & PARTS FOR V SERIES

	Price	Form	Form
Globes only, clear glass.....	\$1.05	\$1.05	200
" " opal.....	1.45	2.25	
" " green, blue or orange.....	2.25	3.10	
" " ruby.....	3.10	3.85	
Guards Cast Aluminum.....	2.40	2.95	
Half Shades.....	1.60	2.30	
Receptacle with Gasket.....			55
Reflector Holders Cast Aluminum.....	.55		85
Adaptor.....	.65		
	1.00		100

GS VAPORPROOF FIXTURES

Crouse-Hinds Cat. 2200 Page 56
Adanti Bulletin 107E Page 12B

Adapti-Bulletin 107-E Page 19B

FITTINGS, THREADLESS

STANDARD TYPES

"Kondu" "Adaptilets" "Appleton" Crouse-Hinds or Similar

Size—	3/8"	3/4"	1"	1 1/8"	1 1/4"	2"	2 1/2"	3"	3 1/2"	4"		
A Covers Extra...	\$0.44	\$0.55	\$0.70	\$0.79	\$1.23	\$1.65	\$2.35	\$2.65	\$3.55	\$4.12		
B .....	.50	.66	.90	2.05	2.55	3.95	6.95	9.10	11.50	19.00	
C70	8.85	1.25	2.05	2.80	5.30	9.40	12.00	16.75	21.10
CO .....	..	..	.90	1.20	1.44	2.35	3.30	6.40	..	..
E50	.63	.88	1.45	1.95	3.90	6.95	8.35	12.90	14.90
LB-LL-LR-L...76	9.2	1.32	2.20	3.05	5.40	9.65	12.40	18.60	22.30
LBL-LBR...	..	..	1.19	1.57	2.18	..	..	..	..	..	..
T&TB All 1 Size...	9.8	1.27	1.74	2.85	4.00	6.55	11.40	15.80	22.00	27.30
TA	1	..	1.39	1.73	2.24	..	..	..	..	..	..
TL-TR .....	..	..	9.8	1.30	1.74	..	..	..	..	..	..
U-UB .....	..	..	8.05	1.05	1.50	2.50	3.40	6.10	..	..	..
X All 1 Size...	..	..	1.25	1.72	2.30	4.22	6.05	9.90	..	..	..

TYPE IUGC AND IUCB

Unions	Thick Walls	\$.37	\$.53	\$.79	\$1.19	\$1.65	\$3.30	\$5.30	\$7.90*	10.50	\$15.84
	Thin	*	.26	.40	.66	1.05	1.39	2.77	...	...	...
Conn.	Thick	*	.26	.37	.76	.92	...	...	...	...	...
	Thin	*	.22	.33	.59	...	...	...	...	...	...
UCT	Adapter		.05	.08	.13	...	...	...	...	...	...

TYPE FS SERIES

Type	One Gang		Two Gang		Three Gang		Four Gang	
	$\frac{3}{4}''$	$\frac{3}{4}''$	1"	$\frac{3}{4}''$	$\frac{3}{4}''$	$\frac{3}{4}''$	$\frac{3}{4}''$	$\frac{3}{4}''$
FS	\$0.90	\$1.10	....	\$1.72	\$1.91	\$2.57	\$3.10	
FSA	.99							
FSC	1.25	1.52	\$1.91	1.98	2.18	2.90	3.50	
FSD	1.25	1.52	....	2.24	2.57	....	....
FSL-FSR	1.25	1.52	....	....	....	....	....
FSLA	1.25	1.52	....	....	....	....	....
FSCT	1.65	2.18	2.57	....	....	....	....
FSCT	1.65	2.18	2.57	....	....	....	....
FSCT	1.65	2.18	2.57	....	....	....	....
FSCT	1.65	2.18	2.57	....	....	....	....

These prices apply only to the United States.

Editorial

	34°	34°	1°	14°
Ent. Ells with Cov. Ser. 1100.....	\$0.35	\$0.40	\$0.50	\$0.85
" Fitt. with Cov. Ser. 2700.....	.40	.45	.60	.75
Angle Ent. Fitt. with Cover Ser. 2700.....	.45	.50	.60	.95
Signal Ent. Caps No. 2810-2811.....	.75	.80		
	15°	2°	25°	3°
Ent. Ells with Cov. Ser. 1100.....	\$1.50	\$3.00		
" Fitt. with Cov. Ser. 2700.....	1.70	2.95	\$5.95	\$7.60
Angle Ent. Fitt. with Cov. Ser. 2700.....	1.80	3.00	6.35	
	140-3811			

FITTINGS, ENTRANCE OR SERVICE

SP-1410 Complete Coupling for $\frac{1}{2}$ " Conduit.....	Price \$1.15
SP-1420	25

FITTINGS, ENTRANCE OR SERVICE

Hangers

HANGERS

FOR CABLE & CONDUIT
Mineralac*

Mfgs.	Conduit	Lead Covered	Price	Porcelain	Bushings	For RC	Price
No.	Size	Cable Size	Jap. Fin. Giv. Fin. No.	Mfgs. No.	Cable		
0	14"	No. 14	\$.06	\$.08	1	8-2/0	
1	14-3/4"	No. 1 to 4/0	.07	.10	2	3-0-4/0	.10
2	4/0 to 300 M		.10	.11	3	250M-450M	.11
3	14"	500 to 750 M	.10	.11	4	500M-700M	.13
4	14"	800 to 1125M	.11	.14	5	750M-1000M	.14
5	2	1500 M	.12	.15	6	1125-2500M	.20
6	23/4	2000 M	.15	.16			

T & B ADJUSTABLE HANGERS

For Standard or Thin Wall Conduit

Price Each

Type A Clamp Including Bolts Fits Flange 2 1/4" to 7 1/2"..... \$4.45

Type B & C Clamp Including Bolts Fits Flange 7 to 12"..... .70

Special Bolts..... .10

For Complete Hanger Add Supports Below to Above Prices.

Supports for above Hangers

	14"	14-3/4"	1"	14-1/2"	2"	23/4"	3"
For One Conduit Steel	\$.12	\$.15	\$.25	\$.30	\$.35	\$.50	\$.60
" Two Conduit Mill.	.18	.20	.30	.35	.45		
" Four Conduit Mill.	.28	.35					

HANGERS & PERFORATED BAR

Graber and Paine

Graber Perforated or Extension Strip

For 14 to 14-3/4 Conduit Per Foot	\$.08
" 2" to 2"	.10
" 3 1/2 to 6"	.12

Paine Adjustable Pipe Hangers

	14"	14-3/4"	1"	14-1/2"	2"	23/4"	3"	3 1/2"
Hanger Ring, Perforated	\$.10	\$.10	\$.15	\$.15	\$.20	\$.20	\$.25	
Hanger Iron, and Flat Head								
Lag Screw	\$.10	\$.10	\$.15	\$.15	\$.20	\$.20	\$.25	\$.25

Graber Hangers

No.		14"	14-3/4"	1"	14-1/2"
1	Hinge Hanger with Extn. Bar & Lag Screw	\$.18	\$.18	\$.20	\$.22
5	Band Hanger Extn. Bar and Lag Screw	.10	.10	.15	.15
13	Hinge Hanger, Socket and Beam Clamp	.34	.34	.37	.38
200	Band Hanger Only	.10	.10	.12	.13
		1 1/2"	2"	2 1/2"	3"
1	Hinge Hanger with Extn. Bar & Lag Screw	\$.25	\$.27	\$.30	\$.34
5	Band Hanger Extn. Bar and Beam Clamp	.20	.30	.30	.35
13	Hinge Hanger, Socket and Beam Clamp	.40	.47	.48	.50
200	Band Hanger Only	.14	.16	.18	.20

FAN HANGERS

Frank Adam	Type "Security"	Complete with Outlet Box	\$.30
	FHSB	Lesa	2.90
Arrow and H	H 7750-51		3.80
General Electric	2755		2.50
Russell & Stoll	661	Complete with Brass Plate No Box	2.90
Russell & Stoll	662	Bake	3.10
Russell & Stoll	649	Bake and	3.30
Russell & Stoll	729	Bake	3.50

STANDARD SHADE HOLDERS

2 1/4" Uno with Screws	\$.01	2 1/4" W.P. with Screws	\$.02
2 1/4" Spring	.15	3 1/4"	.35
Form H with Screws	.30	4"	.60
" Spring	.35	2 1/4" Contractile Collar	.10
3 1/4" Screws	.30	3 1/4"	.80
4"	.40	4"	.40
	50		

KNOBS, TUBES & CLEATS, PORCELAIN

KNOBS

Type		With Screw	With Nail	Without Screws	Price Each
No. 1 Nalit Knob.					
No. 5/4 Split Knob					
5/4 Solid Knobs					
5/2 Screwit					
4 & 4 1/4 Knob Solid					
No. 9419 Split 1 1/2 x 1 1/4					
9420 Split 3 1/4 x 3 1/4					
22 Victor Split					
6061 Solid Teleph. 2 Groove					
6082					

TUBES

Diam.	3" & under	4"	5"	6"	8"	10"	12"	14"	16"	Length
Price Each	\$.01	\$.0114	\$.02	\$.03	\$.10	\$.17	\$.25	\$.32	\$.40	
"	.02	.0214	.03	.05	.11	.19	.27	.35	.43	
"	.04	.05	.06	.07	.13	.21	.30	.38	.47	
"	.07	.08	.09	.11	.15	.25	.34	.43	.52	
"	.10	.12	.13	.15	.18	.29	.39	.49	.59	

CLEATS

2 & 3 Wire

Standard No. 234 2 & 3 Wire Unglazed Cleats without Screws Per Pair \$0.04

Glazed

\$.06

One Wire Cleats

B & D Type—2 Piece Porcelain

No.	Height	Length	Width	For Size Wire	Price Each
1A	1 1/2"	1 1/2"	1 1/2"	14 to 6	.06
1 1/4A	2 1/4"	1 1/2"	1 1/2"	2	.08
2A	3 1/4"	1 1/2"	1 1/2"	2	.11
2 1/4A	2 1/4"	1 1/2"	1 1/2"	0	.14
3A	3 1/4"	1 1/2"	1 1/2"	000	.17
3B	3 1/4"	1 1/2"	1 1/2"	200,000 CM.	.16
3 1/4B	3 1/4"	1 1/2"	1 1/2"	500,000 CM.	.20
4B	4 1/4"	1 1/2"	1 1/2"	1,000,000 CM.	.27
4 1/4B	4 1/4"	1 1/2"	1 1/2"	1,250,000 CM.	.35

These prices apply only to the United States

Electrical Contracting, March, 1932

LOOM & L-SUNDRIES

LOOM, NON-METALLIC CONDUIT

Size	1/8"	1/4"	1/2"	1"	1 1/2"	2"	3"
Price per Foot	\$.03 1/2	\$.04 1/2	\$.09	\$.12	\$.16	\$.19	\$.32

Clips for Loom 2c Each or 3 for 6c

SOLDERING LUGS—One Hole

Sherman-Trumbull or similar

For Wire Size	Wire Amps	Wire Hole	Price Each	For Wire Size	Wire Amps	Wire Hole	Price Each
No. 10 Under	25	1/8"	\$.02	0000	225	1/8"	\$.12
8	35	1/4"	.02	0000	237	1/8"	.20
6	50	1/2"	.03	400	235	1/8"	.34
4	70	1"	.04	450	236	1"	.42
2	90	1 1/2"	.05	500	236	1 1/2"	.52
0	125	2"	.06	600	236	2"	.55
00	150	2 1/2"	.08	800	236	2 1/2"	.85
000	175	3"	.10	1000	236	3"	1.00

For 2-Hole Lugs

With Regular Stud Holes Add 50% To Above Prices.

LINKS—For Chain

Non-Insulating Splicing Links—Any Make—Each	Price
Insulating	.15

Luminous Acorns—See Page PL-4 and Page PL-18.

MAIL BOXES

COUCH

No. 73 Tilting Mail Boxes Post Office approved per Receptacle..... \$3.30

"TILTING" Speaking Tube Type

Series 7303 to 7309 and 73010 to 73012

No. of Boxes	3	4	5	6	7	8	9	10	11	12
Price ea.	12.90	17.20	21.50	25.75	30.00	34.35	38.60	43.00	47.30	51.50

SINGLE GANG Non-Tilting

No. 78 or 780 with call button or speaking tube unit..... Price each \$3.15

MOLDING, NATIONAL

FITTINGS

Number	Description	Price	Number	Description	Price
315	Connector	\$.40	365	4 1/2" Canopy Base	\$.60
316	90 Deg. Coupling	.02	365A	4 1/2" Stud	.65
317	90 " Connector	.03			
322	Joint Cap	.05	365X	4" Comb. Plate	.18
324	Cross	.35	306	6" Canopy Base	.85
335	Tees	.22	369X	Open Work Coup.	.40
336	90 Deg. Elbow	.15	376	Corner Box	.45
337	90 " Elbow	.15	400	Box For Socket	.70
338	90 Deg. Internal Elbow	.17	406	2 1/2" Recep. Base	.25
340X	Terminal Block	.30	414-S	Combination Fitting	.24
342	3 1/2" 5 Amp. Box	.45	430	Fixture Recept.	.65
343	2 1/2" 5 Amp.	.45	437	45 Deg. Elbow	.20
344X</td					

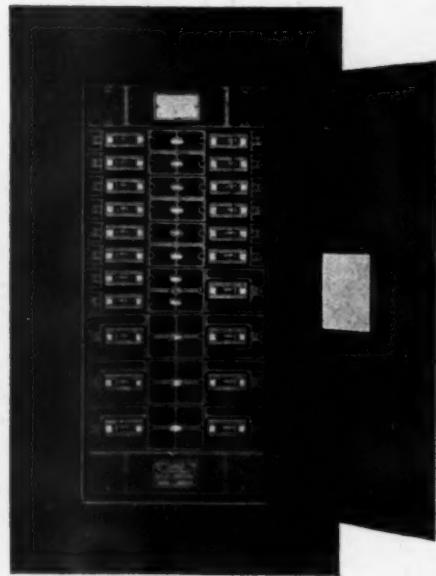
... NOW ...

ADVANTAGES OF "DE-ION" BREAKERS

- 1 Time lag prevents unnecessary tripping on slight, momentary overloads.
- 2 Can be reclosed by anyone as easily as a switch. Nothing to replace or to renew.
- 3 Cannot be held closed against an abnormal overload or short circuit.
- 4 Cannot be blocked to prevent its opening the circuit.
- 5 Rating cannot be changed by unauthorized persons.
- 6 Completely dead front, giving greatest safety.



Nofuze Distribution Panelboard using "De-ion" breaker. This shows the interchangeability between various ratings of breakers.

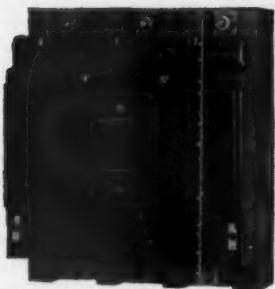


Combination NAB (one-pole) and AB (two-pole) Nofuze Panelboard equipped with "De-ion" branch circuit breakers. Note that one 2-pole breaker takes exactly as much room as two single-pole breakers.



"De-ion" Switchboard with breakers mounted back of board. The compact design is made possible by the "De-ion" principle.

• FOR ANY CIRCUIT • ANYWHERE



"De-ion"
FUSELESS
PROTECTION

IMAGINE a building without a fuse, where circuit protection cannot be weakened or destroyed . . . where opened circuits can be restored to service by anyone . . . easily . . . quickly . . . safely.

Such buildings are now possible. The Westinghouse "De-ion" breaker, used for nearly three years in Nofuze panelboards—and so tested on almost 100,000 circuits—is now available in ratings up to 225 amperes. On every electrical circuit from point of entry to point of load—on switchboard, distribution and lighting panelboards—"De-ion" breakers give greater convenience and greater safety.

NOFUZE DISTRIBUTION SWITCHBOARDS, "DE-ION" BREAKER EQUIPPED

"De-ion" breakers result in smaller, lighter,



completely dead-front switchboards. Floor space needed is cut almost in half, greatly simplifying the building layout.

"DE-ION" BREAKERS IN NOFUZE PANELBOARDS

Nofuze power and lighting panelboards can now be equipped with "De-ion" circuit breakers instead of switches and fuses. A completely dead-front installation, with tamper-proof, easily reclosed circuit protection is thus available.

"De-ion" breakers can also be furnished in boxes for motor disconnect units and in Nofuze Load Centers for home wiring circuits.

Mail the coupon below for further information about "De-ion" fuseless protection.

Westinghouse

T 31991

Quality workmanship guarantees every Westinghouse product

SEND FOR BOOKLET

Westinghouse Electric & Mfg. Company
Room 2-N—East Pittsburgh, Pa.

Gentlemen: Please send me a copy of Cir. 1939.

Name.....

Company.....

Address.....

City..... State.....

EC 3-32

Plugs, Appliance

PLUGS, APPLIANCE, Continued

Beaver	F-31	Standard Heater Plug—Single Sided Cont.	\$0.15
"Gripall" & "Suitzall"	F-32	Heater Plug Double Sided Contacts	.20
	F-33	Armored Casing (F-32 Type Armored)	.25
	F-34	Medium Heater Plug—Bakelite	.25
	F-36	Small Heater Plug—Black	.20
G-1	"Gripall" Heater Switch Plug Adj. Cont.	.80	
G-2	"Gripall" Heater Switch Plug Nickel Alloy Contacts	.90	
G-21	Competitive Push Button Type	.45	
G-22	New Toggle Type	.45	
Belden	1708	Aircool Heater Plug	1.00
Bryant	668	Universal Appliance Plug with Switch	.90
	669	Switchless	.50
	752	Appliance Plug with Indicating Switch	.60
	2966	Small Switchless Plug	.45
Cutler-Hammer	7051	Appliance Plug with Switch	.60
G. E.	2602	Armored Heater Plug No Switch	.25
	2633	Large Heater Plug	.20
	2842	Switch	.45
	2699	Small " " No	.25
	2826	"Handy Pull" Heater Plug	.30
Hemco	H250	Switchless Appliance Plug Bakelite	.50
	H260	Switch	.90
Hotpoint	CD6P1	Iron Plug No Switch	.45
	CD69P1	• • • Armored	.60
	CD79P1	• with •	1.00
Kool-Pull (Noark)	8037	Appliance Plug—No Switch	.75
	8039	• with •	1.00
Propp	5	One 4-All Appliance Plug—No Switch	.30
	52	Iron Plug with Switch	.50
	55	Standard Iron Plug—No Switch	.20
	56	Armored	.30
Keynolite	500	Heater Plug No Switch	.40
	510	• with Switch	.75
Rodale	P-21	Heater Plug No Switch Cold Molded	.15
	P-29	• • • Armored	.20
	450	F-tall Heater Plug—No Switch	.45
	610	Bakelite	.20
	615	• Armored Heater Plug—No Switch	.30
	850	Iron Plug with Switch	.45
	800	• • • Armored	.65
Simplex	890	Armored Plug—No Switch	.75
	990	Deluxe Chromplate Plug	1.00
Sunbeam	A-85	Heater Plug	1.50
Torrid	B-0808	Automatic Heat Control Plug For AC Only	1.00
	B-080	Safety	1.00
Waage	3 & 4	Heat Plug Only	.50
Westinghouse	209423	Appliance Plug—No Switch	.75
	373656	• With •	1.00

PANEL BOARDS OR FUSE CABINETS

FRANK ADAM

All 30 Amp.—S. P.—NEC Fuses	4	6	8	12
"FRB" Safety Type Fuse Boxes	Branch	Branch	Branch	Branch
"NR" Main Cable Lug Only	\$ 3.90	\$ 5.60		
"NR" Solid Neutral	11.15	13.40	15.60	
NR3G Main Cable Lug Only			16.50	19.80

All for Plug Fuses BENJAMIN-STARRATT

Cat.	4	6	8	10	12	
No. Type and Description	Circ.	Circ.	Circ.	Circ.	Circ.	
66104-12 NF	One Fuse 3 Wire Serv.	\$ 5.20	\$ 7.40	\$ 8.90	\$ 10.40	\$ 11.90
66204-12 P	Two Fuse 2 and 3 Wire Serv.	7.50	11.15	13.35	15.60	18.60
66304-12 NEP	One Fuse with Switch Pl.	7.10	10.30	12.80	16.50	19.15
66404-12 EP	Two Fuse with Switch Pl.	10.30	15.25	19.15	21.80	25.15

BULLDOG FUSENTERS

No.	Description	2	4	6	8	10	12
CBS	Surface Black Finish with shield	\$1.80	\$2.30	\$3.90	\$7.00	\$9.75	\$10.30
BOS	Black Finish with out Shield	1.65	2.15				
BF	Flush Luminized Finish	2.50	3.70	5.35	8.75	10.30	11.75
BBF	Black Finish	2.00	2.75	4.70			
BSF	Lum. Finish with Toggle Switches		6.80	9.00	12.20	15.70	19.80
BSSF	Lum. Finish with 30 A. Saftofuse		20.50	22.00	31.75	33.35	35.00
BSSF	Lum. Finish with 60 A. Saftofuse		21.50	22.20	32.25	33.75	35.40
BKF	Lum. Finish with Pull Box		6.60	9.00	14.85	17.35	19.80

FUSE CABS—All-Steel-Equip. Co.

Style and No.	Description	2	4	6	8	12
C702-4-6	Surf. Small Type Black	\$1.50	\$2.25	\$3.55		
C902-4-6	Flush	1.50	2.25	3.55		
D3008 & 12	Surf. Sgl or Two Fuse				\$5.95	\$8.75
D3038 & 42	Flush				5.95	8.75
DS4304-6-8-12	Surf.				4.95	7.00
DS4304-6-8-12	Flush				4.95	7.00
DS3304-6-8-12	Surf.				4.95	7.00
DS3304-6-8-12	Flush				4.95	7.00
					9.10	14.45

KILLARK

		2	4	6	8	10	12
Standard Flush Type Panels	Circ. Circ. Circ. Circ. Circ. Circ.	\$2.00	\$2.90	\$4.75	\$6.50	\$8.50	\$10.75

CUTLER-HAMMER—Fuse Panels—Flush Mounting

All 30 Amp.

Circuits	2 Cir.	4 Cir.	6 Cir.				
Black Finish Series 4355 H25-30	\$ 1.80	\$ 2.50	\$ 4.45				
Aluminum Finish Series 4355 H25-30	2.30	3.30	5.10				

Circuits

Black Finish Series 4355 H25-30	8 Cir.	10 Cir.	12 Cir.				
Aluminum Finish Series 4355 H25-30	\$ 7.85	\$ 9.50	\$11.15				

	8.25	9.90	11.15				

These prices apply only to the United States

G. E. or TRUMBULL—Residence Panel Boards

Surface or Flush Mounting	4	6	8	10	12
Single	No 3104 to 3212	Circ.	Circ.	Circ.	Circ.
Flush Mtg. or Fusing	2906 to 2912				
Surface Mtg.	2906 to 3412	\$2.80	\$4.55	\$9.65	\$11.25
Double	No 3404 to 3412				
Flush Mtg. or Fusing	2704 to 2712				
Surface Mtg.	9.10	12.40	18.15	23.10	26.40

SQUARE D—Fuse Cabinets

Series 37000 to 39000	2	4	6	8	10	12
Flush Series 37000 Black	\$1.85	\$2.50	\$4.50	\$9.50	\$11.15	
37000 Aluminum	2.35	3.35	5.10	8.30	10.00	11.15

NOTE: 2 & 4 Circuit Flush Type arranged for mounting direct to front side of studding with channels for lathe ends, each..... \$0.20

Combination Fuse Cabinets

60 Amp. Fuse Break and	2	4	6	8	10	12
30 Amp. Circuits	Only	Circ.	Circ.	Circ.	Circ.	Circ.
Flush Mounting Aluminum	\$7.45	\$12.40	\$14.00	\$14.85	\$23.00	

Surface \$0.45 10.75 11.55 12.40 20.65

WADSWORTH Fuse Cabinets & Panelboards

All Dead Front Single Fusing	2	4	6	8	10	12
Surface Mtg.	\$2.30	\$3.00	\$4.85	\$5.75	\$7.55	\$11.55
Flush Mtg. Hanger Support	2.85	3.80	6.10	7.55	10.20	12.00
Flush Type for Tige Sw.	6.85	11.10	13.75	16.40	19.85	
Surface Mtg. Enc. Panel Boards 100 Amp.	\$22.00	\$25.35	\$32.00			

Flush 24.75 28.00 34.65

Pothead Compound Per Pound..... .55

Pothole Compound Per Pound..... .55

Pothead Compound Per Pound..... .55

Pothead

HEAVY DUTY WEATHERPROOF SOCKETS
Copper or Aluminum Shell

	All Keyless	Price
1 Piece with $\frac{1}{4}$ or $\frac{3}{8}$ Nipple		\$0.70
1 " " Cord Grip		.65
2 " " $\frac{1}{4}$ Nipple		.80
2 " " $\frac{3}{8}$ "		.80
2 " " Cord Grip		.85
Shareholders for above sockets		
2 $\frac{1}{4}$ Aluminum or Copper Extra		\$0.30
2 $\frac{1}{4}$ " " "		.50
4 " " "		.65

HEAVY DUTY SOCKETS—Benjamin

	Price Each
Benox Keyless Socket with Clamp Ring Medium Base	\$1.25
" without " "	1.05
" Pull " with " "	2.00
Benco Keyless Socket Copper or Alum.	.75
" Brass	.90
" Pull " Brass, Copper or Alum	1.50
" Mogu " Copper Clad	2.00
Benco Threaded Holders Only	2 $\frac{1}{4}$, 3 $\frac{1}{4}$, 4"
Polish. Alum. Weatherprf	.35 \$0.60
Copper	.40 .60 \$1.00
Brushed Brass	.40 .60 1.00

BENJAMIN MOGUL SOCKETS

	With	With
	$\frac{1}{4}$ or $\frac{3}{8}$	$\frac{1}{4}$ or $\frac{3}{8}$
Without	Iron	Alum.
Yoke	Yoke	Yoke

One Piece Socket with Lamp Grip..... \$1.00 \$1.15 \$1.50

Two Piece Socket with Lamp Grip..... 1.20 1.45 1.70

BENJAMIN REFLECTOR SOCKETS

	With Type X or XR Fitting
Medium Base Keyless Tapped $\frac{1}{4}$ - $\frac{1}{4}$ - $\frac{1}{4}$	\$1.20
" " " Self-Locking $\frac{1}{4}$ - $\frac{1}{4}$ - $\frac{1}{4}$	1.60
" " " Shock Absorb. $\frac{1}{4}$ - $\frac{1}{4}$ - $\frac{1}{4}$	1.45
" " " Shock Absorb. Self Lock	1.90
" " " Pull Chain	2.05
Mogu Base Keyless Shock Absorbing	1.95
" " " Not Shock Absorbing	1.65
If X or XR Fitting not supplied on above sockets deduct	.45

SWITCHES, FLUSH TUMBLER

All Square Handle		Price
Plates and Boxes Extra		
Porc. Cup—S. P.	\$0.30	
" " " D. P.	1.15	
" " " 3-Way	.45	
" " " 4	3.25	
Compo—S. P.	.90	
" " " D. P.	1.50	
" " " 3-Way	1.15	
" " " 4	3.50	
Pore. " " " S. P.	.20	
" " " 3-Way	.40	
Compo. 20 A.—S. P.	1.35	
" " " 20 A.—D. P.	1.55	
" " " 20 A.—3-Way	1.65	
" " " 30 A.—S. P.	1.75	
" " " 30 A.—D. P.	2.35	
" " " 30 A.—3-Way	2.35	
Porc. Cup—S. P.	1.60	
" " " D. P.	2.30	
" " " 3-Way	1.65	
" " " 4	4.90	
Twin 2 S. P. Switches	1.40	
NEW 1 " 1 3-Way Switches	1.55	
CIRCUIT 2 " 2-3-Way Switches	1.75	
TYPE Triplet—3 S. P. Switches	2.10	
2 S. & 1 2-Way	2.25	
EXTRAS—For Luminous Tip add for Each Handle	.40	
For Glo Guide Handle Switches add for Each	1.00	

TUMBLER SWITCH COMBINATIONS

Description	Price
6 A. S. P. Switch—Pilot Lt.—Textolite Plate	\$2.85
10 A. D. P. Switch—Pilot Lt.—.060 Plate	3.30
10 " " " Receptacle	1.90
20 " " " 15A " "	2.20
Switch—Tap & Receptacle with "	1.65

PLATES For Tumbler Switches

	1	2	3	4
	Gang	Gang	Gang	Gang
Stamped Brass Sprayed Finish .040 Thick	.50	\$1.20	\$1.30	\$1.10
" Brush Brass .040 "	.15	.30	.45	1.35
" Sprayed .060 "	.20	.40	.60	1.33
" Brush Brass .060 "	.25	.50	.75	1.60
Bakelite Plate for Receptacle or Switch	.15	.30	.45	.80
Chromium plate for Receptacle or Switch	.55	1.10	1.65	2.60
Bakelite Plate for 30 Amp. Tumbler Switch	.25	.50	.75	
Twin & Triple B. or Bakelite Plates	.25	.50	.75	
Comb. Switch and Receptacle—Moulded Comp.	.30	.40		
" " " Pilot Light	.75			
Hubbell Bakelite Screwless Plates	.60	1.10	1.60	2.25
Bryant Bakelite Any Finish	2.75	4.70	7.70	
" " " All Metal	1.00	1.75	2.45	
Guth Porcelain Enamel Plates	.25	.50	1.00	
Glass Mirror Plates	1.00	1.75	2.50	3.25
Blank Plate .040 Brush Brass Finish	.30	.60	.90	

SWITCHES, FLUSH PUSH

Plate & Boxes Extra	Price
Standard Shallow Type Porcelain Cup—Single Pole	\$0.40
" " " " " Double	1.50
" " " " " 3 Way	.70
" " " " " 4	3.85
Deep Type Porcelain Cup—Single Pole	.75
" " " " " Double	1.50
" " " " " 3 Way	1.45
" " " " " 4	3.85

Plate and Boxes Extra—Continued

Special High Grade Composition Cup—Single Pole	\$1.50
" " " " " Double	1.85
" " " " " 3 Way	1.85
" " " " " 4	4.20
Lock Type Standard Porcelain Cup—Single Pole	1.80
" " " " " Double	2.35
" " " " " 3 Way	2.35
" " " " " 4	5.00
Electrolier Non-Indicating	2.00
" " " Indicating	2.35
Extra for Luminous Button Add Per Switch	.40

PUSH SWITCH COMBINATIONS

With Plates	Price
Bryant 117 D. P. Indicat. Switch Flush Receptacle & .060 Plate	\$2.50
413 One Push Switch-Bull's Eye and Solid Plate	4.80
518 " Disap. Door Recpt. Bull's Eye—Solid Plate	8.85
465 " D. P. Flush Switch & Pilot Lamp .060 Plate	3.90
467 " Flush Switch—Flush Recpt.—Bull's Eye—Solid Plate	6.15
558 " Duplex	7.00

PLATES For Flush Push Switches

	1	2	3	4	Price
Description	Gang	Gang	Gang	Gang	
Stamped Brass Sprayed Finish .040 Thick	.15	.30	.45	.60	\$1.10
" Brush Brass .040 "	.20	.40	.60	.90	1.35
" Sprayed .060 "	.25	.50	.75	.90	1.35
" Brush Brass .060 "	.30	.60	.90	1.10	1.60
Bakelite or Composition	.15	.30	.45	.60	.80
Bryant DeLuxe Plates Wood Inlaid	2.75	4.70	7.70		
" All Metal	1.00	1.75	2.50	3.25	
Guth Porcelain Enamel Plates	.25	.50	1.00		
Glass Mirror Plates	1.00	1.75	2.50	3.25	
Blank Plate .040 Brush Brass Finish	.30	.60	.90		

SWITCHES, SURFACE SNAP

METAL COVERED SNAP SWITCHES

	5	10	20	30	Price
Poles	Volts	Type	Size	Amp.	
Single	125	Non-Indicating	Pony	.40	
"	"	Indicating	"	.45	
"	"	Standard	"	.60	\$1.75
"	"	Indicating	"	.65	1.95
"	"	Indicating	"	.90	2.45
Double	250	Non-Indicating	"	1.05	2.95
"	"	Indicating	"	1.25	3.50
Triple	"	Non-Indicating	"	1.50	6.00
3-Way	125	Non-Indicating	"	1.70	3.20
4-Way	"	Non-Indicating	"	1.85	3.80
Electrolier	"	Non-Indicating	"	2.10	
"	"	Indicating	"	2.30	

ALL PORCELAIN SNAP SWITCHES

	5	10	20	30	Price
Poles	Volts	Type	Size	Amp.	
Single	125	Non-Indicating	Pony	.50	
"	"	Indicating	"	.60	
"	"	Standard	"	.70	\$3.00
"	"	Indicating	"	.75	1.30
"	"	Indicating	"	1.00	3.20
Double	250	Non-Indicating	"	1.00	3.30
"	"	Indicating	"	1.20	3.75
3-Way	125	Non-Indicating	"	1.00	3.25
4-Way	125	Non-Indicating	"	1.80	3.75
Electrolier	125	Indicating	"	2.30	

TUMBLER OR TOGGLE SURFACE SWITCHES

	5	10	20	30	4	Price
	Pole	Pole	Way	Way	Way	
125-250 Volt						
5 Amp. Closed or Slott. Base						
5 Amp. with Outlet Box Cover 3 $\frac{1}{2}$ or 4 $\frac{1}{4}$						
10 Amp. Closed or Slott. Base						

	5 Amp. 125 Volts	Indicating	Non-Indicating	Indicating	Indicating	Non-Indicating
Single Pole						
"						
Double						
Three Way						
Electrolier						

PARTS FOR SNAP SWITCHES

	Handle	Base	Cover	Price
	Handles—Standard Type Each	\$1.12	Ratchet Type	\$.20
	Bases—Porcelain 5 Amp. \$1.12—10 Amp. \$1.15—20 Amp.			\$.20
	Covers—10 Amp. & Under Metal \$1.15—Porcelain			\$.20
	Over 10 Amp.			\$.30

SWITCHES, PULL CORD, CHAIN, CANOPY, LEVOLIER, ETC.

	PULL SWITCHES—BODIES ONLY	Small Socket Type	Price

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Switches, Pull Cord

CEILING PULL SWITCHES MOUNTED ON
OUTLET BOX COVERS

Arrow—H & H or Equal	
For 3/4" Outlet Box Single Pole.	\$2.00
" " " D. P.—3 & 4 Way-2-3 Circuit.	2.40
" " " Single Pole.	2.00
" " " D. P.—3 & 4 Way-2-3 Circuit.	2.40

HEAVY DUTY PULL CORD SWITCHES, METAL COVER

With Chain or Chain & Cord	Price
S. P. with Small Porc. Slotted or Solid B.	\$1.60
D. P. with Small Porc. Slotted or Solid B.	1.90
3 & 4 Point with Small Porc. Slotted or Solid B.	1.90
These switches can be furnished with side or bottom open, at same price.	

TYPE "O" PULL SWITCHES
For Ceiling Fixtures or Ceiling Fans

Single or Double Pole—3 & 4 Point Electrolite & Motor Control—Similar to Bryant #2473 to 2480 with 3/4 Caps, cord & Ball Each.	\$3.00
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CANOPY SWITCHES

Rotary Canopy Switches any style any make (except below).	Price
Tumbler Canopy Switches similar to G. E. 2381.	.55
Full Type P & S—3316 or 17—Arrow—H & H #7743-6—Bryant 2842.	.90

LEVOLIER PULL SWITCHES

McGill Co.	Price
Two-Lite Canopy or Fixture Switch #50-51-52.	\$1.00
Link Switch #50.	1.00
Conduit Box & Fixture Switch #41-62 & 63.	1.00
Switch Hickey 64 & 64 A for above.	.15
Center Pull #38.	1.00

PENDANT SWITCHES

With Pendant Cap	Price
Brass Shell Pend. Cap	
Side Button.	.50
Bottom.	.90
" Type "O" Pend."	2.00
All Porcelain	
Side.	.60
" Rim.	.90
" (10 Amps).	.90
Pendant Switch & Current Tap. Comp.	1.00

FEED THROUGH SWITCHES

Price
Metal Feed Thru Switch.
Composition Feed Thru Switch. Flat Back.
Composition Feed Thru Switch. Egg Shape.
Composition Feed Thru Switch. Pony.

DOOR SWITCHES

Price
Open Circuit—No Box.
Closed.
Iron Box for Door Switch.

DOOR SWITCHES & OPENERS

Edwards	Price
#9 Door Opener Mortise Type \$ 2.75	\$ 6.00
48 " " " #152 Rim Type Flush.	31.25
48 " " " #152 for Surface Conduit.	25.25
48A " " " Rim.	24.25
50 " " " Rim.	31.25
50A " " " Rim.	34.25
51 " " " Plate.	34.25
51A " " " Plate.	35.25
52 " " " Mortise.	38.25
#38—Latch for #52	3.50
Partrick & Wilkins commonly used types	
Mortise Type.	\$2.75
Rim Type.	\$4.25

MOTOR STARTING SWITCHES

For Small A. C. Motors	Price
Arrow or H & H	
Double Pole	30A. 230V.
5 Amp. 600 Volt	30A. 250 Volt
Price	Price
\$2.20	\$2.40
" 2.30	" 2.30
" 2.45	" 2.45
" 2.70	" 2.70

Bryant

Sentinel Circuit Breakers Single Pole for Protection of Fractional H. P. Motors No. BSB-1-2-4-6-8-10-12 and 14.	\$2.65
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Trumbull

Small Motor Starting Switches	
No. 2221—2 Pole 30A. 125 Volt—2A. 250 Volt—3A. 600 Volt without Overload Protection.	\$2.00
No. 2361—3 Pole 30A. 125-250 Volt—3A. 600 Volt without Overload Protection.	5.00
No. 2222-6—Single Pole up to 1/2 H. P. 230 Volt A. C. and 1/4 H. P. 115V. A. C. with Thermostatic Overload Protection.	2.90

SWITCHES, KNIFE, ENTRANCE & PANEL

ENTRANCE & PANEL SWITCHES
30 Amp. 125 Volts, Plug Fused

Description	Location of Fuses	Price
Double Pole, Rev. Blades.	Top	\$.80
" Large Size.	Bottom	.80
Triple.	Top	.85
" Large Type.	Top	1.25
Double Pole Single Branch.	Bottom	1.30
" Large Type.	Top	1.30
Double Pole—Double Branch Vert. Mains.	Bottom	1.30
" Horiz. Mains.	Top	1.50
" Horiz. Mains.	Bottom	3.00
" Horiz. Mains.	Top	3.00
" Horiz. Mains.	Bottom	3.15
" Horiz. Mains.	Top	3.15

BABY KNIFE SWITCHES—Any Make

Open Type	Porcelain Base	Slate Base
	125 Volt	250 Volts
	15 Amp. 30 Amp.	15 Amp. 30 Amp.
Single Pole Single Throw.	\$.50	\$.60
" Double ".	.85	1.00
" Single ".	.60	.70
" Double ".	1.00	1.30

TYPE "C" OPEN KNIFE SWITCHES
Slate Base Front Connected

Not Fusible	Fusible
2 Poles	3 Poles
3 Poles	4 Poles
4 Poles	5 Poles
5 Poles	6 Poles
6 Poles	7 Poles
7 Poles	8 Poles
8 Poles	9 Poles
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10 Poles	11 Poles
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198 Poles	199 Poles
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200 Poles	201 Poles
201 Poles	202 Poles
202 Poles	203 Poles
203 Poles	204 Poles
204 Poles	205 Poles
205 Poles	206 Poles
206 Poles	207 Poles
207 Poles	208 Poles

METER SERVICE SWITCHES
"Square D" Main Fuses Sealed Without End Walls

Amps.	Poles	Fused	For	Neutral	Test Type	Meter Number	Price	Non-Meter Test Type	Price
								2 Pole	3 Pole
30	2	2	2	2	2	36211	\$ 3.50	16211	\$ 3.10
30	2	1	2	1	2	36231	3.50	16231	3.10
30	3	2	2	1	2	36331	3.70	16331	3.25
30	2	2	2	2	2	36251	4.10	16251	3.70
30	2	1	2	1	2	36271	3.80	16271	3.40
30	3	2	2	1	2	36371	4.30	16371	3.85
60	2	2	2	2	2	36252	12.90	16252	11.95
60	2	1	2	1	2	36272	12.00	16272	11.10
60	3	2	2	1	2	36372	13.75	16372	12.85
100	2	2	2	2	2	36253	21.25	16253	20.35
100	2	1	2	1	2	36273	21.25	16273	19.45
100	3	2	2	1	2	36373	23.00	16373	21.25

UNIVERSAL METER SERVICE SWITCHES

"Square D" Meter Service Types

Single Type	Ganging Type	Number	Price
No. 32211 or 33211	\$ 3.70	All 30 Amp. 125 Volt	No. 12211-13211.....\$ 4.15
No. 32311	4.00	Single Phase & DC	No. 12311.....4.45
No. 34211	4.60	without end walls	No. 14311.....5.65
No. 34311	5.25		

METER SERVICE SWITCHES
"Square D" Without End Walls Live & Dead Fuse Type

METER TESTING									
Number	Amps.	Poles	Fused	Neutral	Description	Price			
55211	30	2	1	Plug	Solid	Single Type Fuse Dead.....	\$ 2.35		
55211	30	2	2	2	Fused	Live.....	2.95		
SK-916	30	2	1	2	Solid	Live.....	2.95		
55311	30	3	2	2	Solid	Dead.....	3.70		
57311	30	3	2	2	Solid	Live.....	3.70		
15211	50	2	1	2	Fused	Dead.....	2.50		
18211	30	2	2	2	Fused	Live.....	3.35		
39231	30	2	1	2	Solid	Gang Type Acc. M. Fuses.....	4.40		
39331	30	3	2	2	Solid	Gang Type Acc. M. Fuses.....	5.20		
15311	30	3	2	2	Solid	Fuse Dead.....	4.15		
17311	30	3	2	2	Solid	Live.....	4.15		
58251	30	2	2	2	Cart.	Fused	Cart. Live.....	3.30	
26251	30	2	2	2	Cart.	"	Dead.....	4.05	
57351	30	3	2	2	Solid	Live.....	4.05		
28252	60	2	2	2	Fused	"	8.45		
27312	60	3	2	2	Solid	Dead.....	10.80		
14312	60	3	2	2	Solid	Live.....	10.05		
28253	100	2	2	2	Fused	Live.....	15.05		
27313	100	3	2	2	Solid	Dead.....	15.95		
14313	100	3	2	2	Solid	Live.....	27.30		
NON-METER TEST TYPE									
Number	Amps.	Poles	Fused	Neutral	Description	Price			
26311	30	3	2	2	Plug	Solid	Plug Type Fuse Dead.....	\$ 2.58	
26351	30	3	2	2	Cart.	"	Cart. Type Fuse Dead.....	4.05	
SK-659	30	3	2	2	Cart.	Switched	Cart. Type Fuse Dead.....	4.60	
SK-660	60	3	2	2	Cart.	Switched	Cart. Type Fuse Dead.....	11.70	
SK-674	100	3	2	2	Cart.	Switched	Cart. Type Fuse Dead.....	19.20	

POLYPHASE METER SERVICE SWITCHES

"Square D" Accessible Main Fuse Type

METER TEST TYPE									
Number	Amp.	Pole	Fused	Neutral	Description	Price			
30391	30	3	3	3	Cart.	"	\$ 10.65		
30392	60	3	3	3	Cart.	"	20.35		
30393	100	3	3	3	Cart.	"	30.00		
NON METER TEST									
Number	Amp.	Pole	Fused	Neutral	Description	Price			
10391	30	3	3	3	Cart.	"	\$ 10.05		
10392	60	3	3	3	Cart.	"	18.60		
10393	100	3	3	3	Cart.	"	28.25		

"Square D" Sealable Main Fuses

METER TEST TYPE									
Number	Amp.	Pole	Fused	Neutral	Description	Price			
36351	30	3	3	3	Cart.	"	\$ 11.00		
36352	60	3	3	3	Cart.	"	17.80		
36393	100	3	3	3	Cart.	"	26.50		
NON METER TEST									
Number	Amp.	Pole	Fused	Neutral	Description	Price			
SK-671	30	3	3	3	Cart.	"	\$ 4.60		
SK-672	60	3	3	3	Cart.	"	11.70		
SK-673	100	3	3	3	Cart.	"	19.20		

FITTINGS FOR STANDARDIZED SWITCHES

End Walls for 30 Amp. Switches.....	\$.30
60 & 100 Amp. Switches.....	.80
Trough Closing Plates No. 20533-34.....	.10
Connecting Trough No. 20733-34.....	.45
20738-83.....	.80
Universal End Wall & Shutters.....	.30
Meter Shutter only No. 24358.....	.15

OUTDOOR METER BOXES

No.	Description	Black	Galv. or Cad. Plated
12601	With Test Block.....	\$ 7.25	\$ 10.00
12621	Without Test Block.....	5.00	7.70
12611	W. P. Meter Sw. Box.....	10.00	.....

TYPE C—"Square D" Single Throw Quick Break Only

250 Volts Fusible	575 V. AC with Arc Suppres.	Unfused	Fused and			
Amps.	2 Pole	3 Pole	Amps.	2 Pole	3 Pole	
30	#85251	\$ 3.20	#85351	\$ 5.20	30-60 575V. Fused....	
60	#46252	\$ 8.20	#46352	10.00	60 575V. Not Fused....	
60	Solid Neutral	#47312	9.10	60 575V. Fused....	46341 10.95	
100	#46253	\$ 12.70	#46353	15.50	100 575V. Not Fused....	46342 13.65
100	Solid Neutral	#47313	14.60	100 575V. Fused....	46343 17.30	
200	#46254	\$ 20.00	#46354	26.40	200 575V. Not Fused....	46344 21.85
200	Solid Neutral	#47314	23.75	200 575V. Fused....	46344 38.25	

These prices apply only to the United States

TYPE A WITH ARC SUPPRESSORS

"Square D", Quick Make & Break, Single Throw

230 V. DC. and AC. Fusible	250-600 V. DC. and 575 V. AC. Unfused				
Amps.	2 Pole	3 Pole	Amps.	2 Pole	3 Pole
x30	#88251	\$ 10.80	#88351	\$ 13.65	x30 #84252
60	#88252	13.65	#88352	18.20	30-60 #84262
100	#88253	20.90	#88353	27.30	60 #84263
200	#88254	36.40	#88354	40.95	100 #84264
400	#88255	81.67	#88355	90.75	400 #84265
600	#88256	107.25	#88356	127.85	600 #84266
x60	Amo. Sw. with 30 Amp. Spacing				(x-250 Volts only)

30 AMP. TYPE C

"Square D", Quick Break, Single Throw

250 Volts	2 Pole	3 Pole	250 Volts	2 Pole	3 Pole
No.	Description	Price	No.	Description	Price
No. 83251	\$ 3.20		No. 83351	\$ 5.20	
91251	2.65		91351	4.00	
x46251	7.75		x46351	10.00	
			x 60 Amp. Switches with 30 Amp. Clips.		

TYPE "C" SWITCHES

Cutler-Hammer Single Throw Industrial Type

Series 4131

250 Volts DC or AC Fusible	575 Volts AC Fusible				
Amps.	2 Pole	3 Pole	Amps.	2 Pole	3 Pole
30</td					

Switches

Switches

TYPE "A" SWITCHES
Single Throw—Series 4111

Amps. 2 Pole		3 Pole		Amps. 2 Pole		3 Pole	
230 4111H74	\$ 8.65	4111H84	\$ 10.30	200 4111H77	\$ 25.60	4111H87	\$ 31.35
30-60 4111H75	12.40	4111H85	14.45	400 4111H78	74.25	4111H88	82.50
100 4111H76	19.00	4111H86	21.55	x250 V. only.			

MOTOR STARTING SWITCHES

Manual Operated Cutler-Hammer

Type of Switch	Type of Relay	Number	D. C.	A. C. Current	Cycles	Price
Open.	Fast Trip	9101H1	1/4 H. P.	1/4 H. P.	1/4 H. P.	\$2.60
Enclosed.	•	9101H2	•	•	•	3.40
Open.	Slow	9101H54	•	•	•	2.60
Enclosed.	•	9101H55	•	•	•	3.40
Series	Description		Amps.	Volts	2 Pole	3 Pole
4151H1	Light Duty Motor Switch, 1/4 H.P.	30	115	\$ 1.60	.....	.....
or Less.	Cutout.	30	To 550	.....	\$12.65	\$17.55
4231H	For infrequent Duty, 5 H.P.	30	220	5.95	6.20	8.80
4246H	For infrequent Duty 5 1/2 H.P.	30	220	11.40	11.95	13.40
4246H	For infrequent Duty 7 1/2 H.P.	30	440	.....	17.80	21.45
4246H	For infrequent Duty 7 1/2 H.P.	60	220	15.70	17.80	24.35

SMALL ENTRANCE SWITCHES
Trumbull Electric Closed or Open Ends

Numbers	Amps.	Volts	Fusing	2 Pole	3 Pole
5790 EW Porc. Base.	30	125	For 1 Plug Fuse...	\$ 1.70	.....
5791-2-3 & 5803	30	125	• Plug Fuses...	1.85	\$ 3.45
5801-5802 Porc. Base.	30	125-250	• " "	1.85	2.40
13640-13641 Kappa.	30	250	No Fuse-Slate Base.	2.75	4.10
13642-43 & 13743 Kappa.	30	250	For Enclosed Fuses.	2.75	4.35
13221	250	.....	• " "	3.55	5.20

STANDARDIZED MAIN ENTRANCE SWITCHES

Trumbull Electric Single Phase or DC Solid End Plate					
16361	16368	30	125-250	For Plug Fuses...	\$ 3.30
16371	16378	30	•	Enclosed Fuses...	3.65
16381	16388	60	250	•	9.25
16391	16398	100	250	•	15.85

STANDARDIZED METER SERVICE SWITCHES

Trumbull Electric For Meter Testing Open End

Without End Walls					
16300 to 16309	30	125-250	For Plug Fuses...	\$ 2.95	\$ 3.75
16315	16324	30	•	Enclosed Fuses...	3.35
16330	16338	60	•	•	8.45
16341	16348	100	•	•	15.05

ACCESSIBLE FUSE METER SWITCHES

Trumbull Electric With Test Blades With and Without End Walls

Without Test Blades					
18111	30	125	For 1 Plug Fuse...	\$ 3.35	.....
18211-18311	30	125	• Plug Fuses...	4.05	\$ 4.55
18121	30	125-250	• 1 Enclosed Fuse	3.95	.....
18221-18321	30	•	Enclosed Fuses...	4.90	4.90
18122-222-322	60	•	•	15.50	16.75
18123-223-323	100	•	•	24.65	26.40

†With End Walls.

SEALED FUSE METER SWITCHES

Trumbull Electric With Test Blades With and Without End Walls

End Walls					
15827	30	125	For 1 Plug Fuse...	\$ 2.40	.....
28111-29311-28311	30	125	• Plug Fuses...	3.55	\$ 3.75
28121	30	125	• 1 Enclosed Fuse	3.95	.....
28221-28321	30	125-250	• Enclosed Fuses...	4.65	4.65
28122-28222-28322	60	•	•	14.50	15.85
28123-223-323	100	•	•	23.35	24.65

†No End Walls.

UNIVERSAL METER SERVICE SWITCHES

Trumbull Electric Without End Walls

Without Test Blades					
15827	30	125	For 1 Plug Fuse...	\$ 2.40	.....
28111-29311-28311	30	125	• Plug Fuses...	3.55	\$ 3.75
28121	30	125	• 1 Enclosed Fuse	3.95	.....
28221-28321	30	125-250	• Enclosed Fuses...	4.65	4.65
28122-222-322	60	•	•	12.35	13.65
28123-223 & 323	60	250	• Enclosed Fuses	20.70	22.00

†With End Walls.

UNIVERSAL METER SERVICE SWITCHES

Trumbull Electric Without End Walls

With Test Blades					
971-123	30	125	For 1 Plug Fuse...	\$ 3.75	.....
972-123	30	125	For 1 Plug Fuse...	4.70	.....
973-333	30	125	For 2 Plug " Solid Neu.	5.30	\$ 5.30
975-333	30	125	For 3 Combinations...	5.30	5.30
979-333	30	125	For 4 Combinations...	5.30	5.30

†No End Walls.

POLYPHASE ENTRANCE & METER SWITCHES

Trumbull Electric

30 Amp.						60 Amp.					
Series Nos.	Style	3 Wire	4 Wire	3 Wire	4 Wire	Series Nos.	Style	3 Wire	4 Wire	3 Wire	4 Wire
16379	Entrance—"DO-ALL"	\$ 4.70	.....	11.50	\$ 15.50	971-123	30 Amp.	\$ 2.40	.....	60224	\$ 2.95
15321-15623	Acc. Fuse—Test Conn.	11.50	.....	12.70	19.40	972-123	60 Amp.	3.50	.....	50441	2.95
17321-17623	Acc. Fuse without Test Conn.	10.95	.....	12.70	19.40	973-333	30 Amp.	3.50	.....	60225	3.70
26321-26623	Sealed Fuse with Test Conn.	11.50	.....	14.40	17.00	975-333	60 Amp.	4.10	.....	54371	3.30
Series Nos.	Style	3 Wire	4 Wire	3 Wire	4 Wire	979-333	30 Amp.	4.10	.....	59448	4.05
15321-15623	Acc. Fuse—Test Conn.	.....	.....	12.70	19.40	979-333	60 Amp.	4.10	.....	60227	4.05
17321-17623	Acc. Fuse without Test Conn.	25.00	.....	33.45	44.00	979-333	60 Amp.	21.10	.....	59461	8.40
26321-26623	Sealed Fuse with Test Conn.	27.30	.....	44.00	.....	979-333	60 Amp.	22.80	.....	59463	14.95

These prices apply only to the United States

ENTRANCE RANGE AND LIGHTING SWITCH

18422-2W Switch with 1-60 A., 250 V. & 2-30 A. 125 V. Branches.	\$ 23.00
18422-4W Switch with 1-60 A., 250 V. & 4-30 A. 125 V. Branches.	23.80

END WALLS, SHUTTERS, TROUGHS, ETC.

Trumbull Electric

30 A.	60 A.	100 A.
End Wall One Piece for Standardized Switches.	\$.30	\$.80
End Wall One Piece for Polyphase Switches.	.30	.80
Shutters for End Walls for Standardized Switches.	.15	.30
Shutters for End Walls for Polyphase Switches.	.15	.....
Troughs 2" x 4" & 5" x 8" 5" x 10" 6" x 12" 7" x 14" 8" x 16" 9" x 18" 10" x 20" 11" x 22" 12" x 24" 13" x 26" 14" x 28" 15" x 30" 16" x 32" 17" x 34" 18" x 36" 19" x 38" 20" x 40" 21" x 42" 22" x 44" 23" x 46" 24" x 48" 25" x 50" 26" x 52" 27" x 54" 28" x 56" 29" x 58" 30" x 60" 31" x 62" 32" x 64" 33" x 66" 34" x 68" 35" x 70" 36" x 72" 37" x 74" 38" x 76" 39" x 78" 40" x 80" 41" x 82" 42" x 84" 43" x 86" 44" x 88" 45" x 90" 46" x 92" 47" x 94" 48" x 96" 49" x 98" 50" x 100" 51" x 102" 52" x 104" 53" x 106" 54" x 108" 55" x 110" 56" x 112" 57" x 114" 58" x 116" 59" x 118" 60" x 120" 61" x 122" 62" x 124" 63" x 126" 64" x 128" 65" x 130" 66" x 132" 67" x 134" 68" x 136" 69" x 138" 70" x 140" 71" x 142" 72" x 144" 73" x 146" 74" x 148" 75" x 150" 76" x 152" 77" x 154" 78" x 156" 79" x 158" 80" x 160" 81" x 162" 82" x 164" 83" x 166" 84" x 168" 85" x 170" 86" x 172" 87" x 174" 88" x 176" 89" x 178" 90" x 180" 91" x 182" 92" x 184" 93" x 186" 94" x 188" 95" x 190" 96" x 192" 97" x 194" 98" x 196" 99" x 198" 100" x 200" 101" x 202" 102" x 204" 103" x 206" 104" x 208" 105" x 210" 106" x 212" 107" x 214" 108" x 216" 109" x 218" 110" x 220" 111" x 222" 112" x 224" 113" x 226" 114" x 228" 115" x 230" 116" x 232" 117" x 234" 118" x 236" 119" x 238" 120" x 240" 121" x 242" 122" x 244" 123" x 246" 124" x 248" 125" x 250" 126" x 252" 127" x 254" 128" x 256" 129" x 258" 130" x 260" 131" x 262" 132" x 264" 133" x 266" 134" x 268" 135" x 270" 136" x 272" 137" x 274" 138" x 276" 139" x 278" 140" x 280" 141" x 282" 142" x 284" 143" x 286" 144" x 288" 145" x 290" 146" x 292" 147" x 294" 148" x 296" 149" x 298" 150" x 300" 151" x 302" 152" x 304" 153" x 306" 154" x 308" 155" x 310" 156" x 312" 157" x 314" 158" x 316" 159" x 318" 160" x 320" 161" x 322" 162" x 324" 163" x 326" 164" x 328" 165" x 330" 166" x 332" 167" x 334" 168" x 336" 169" x 338" 170" x 340" 171" x 342" 172" x 344" 173" x 346" 174" x 348" 175" x 350" 176" x 352" 177" x 354" 178" x 356" 179" x 358" 180" x 360" 181" x 362" 182" x 364" 183" x 366" 1		

Switches

Switches

TYPE "C" NON-INTERLOCKING—Continued

Single Throw		Fusible		Type "C"	
		3 Pole 2 Blades	4 Pole 3 Blades	5 Pole 4 Blades	
Solid Neutral	Blades Omitted	2 Fuse Holders	3 Fuse Holders	4 Fuse Holders	
230 V.-AC & DC	115-230 V.-AC	115-230 V.-AC	115-230 V.-AC	115-230 V.-AC	
x 30 Amp. Type C		53211P \$ 2.50			
30 "		53221P 3.20	53221 \$ 6.40	53221 \$ 12.75	
60 "		53223 9.10	53223 11.40	53223 20.00	
100 "		53223 14.60	53223 20.50	53223 36.00	
200 "		53224 22.75	53224 31.85	53224 51.00	
400 "	A	53225 63.75	53225 82.00	53225 122.00	

x This Switch for 125 Volts Ed. Plug Fusible.

	2 Pole	3 Pole	4 Pole
30 A. 2 Pole—250 Volt.	53221S \$ 3.20	53221S \$ 4.00	53421S \$ 5.90
30-60 A. DC and 230 Volts.	53222 8.15	53222 8.65	53422 13.60
100 A. AC 3 & 4 Pole.	53223 10.90	53223 12.25	53423 20.90
200 A. 230 Volts.	53224 19.00	53224 22.70	53424 38.10
400 A. AC Only.	53225 36.30	53225 47.20	53425 63.50

30 AMP. SERVICE ENTRANCE SWITCHES

Bulldog—Not Meter Test					
Cat. Number	Volt	Poles	Description	Price	
100211S & P.	125	2	Fusible—For Plug Fuses...	\$ 1.65	
104211S	125	2	" Quick Make & Break...	2.75	
102211S & P.	250	2	" For Cartridge Fuses...	2.50	
103221S & P.	250	2	Not...	2.75	
100311SP & 101311P	115	3	A.C. Plug Fuses...	3.00	
104311S	115	3	A.C. " Quick Make & Break	4.35	

MAIN SERVICE
Meter Test Switches

Combining a Meter Test Switch with Range and Lighting Circuits					
Number	Amp.	Volt	Poles	Neutral	Branches
721204	60	125-250	3	Solid	1-60A & 4-30A \$ 24.10
721206	60	125-250	3	"	1-60A & 6-30A 26.55
431101	Meter Mounting Plate and Cabinet Support.				1.10
412112	End Plate.				.30

"TYPE A"

	2 Pole	3 Pole	4 Pole
250 V. DC & 230 V. AC Fusible			
30 Amp.	10221 \$10.90	10321 \$13.60	10421 \$16.35
60 Amp.	10222 13.60	10322 18.15	10422 21.80
100 "	10223 20.90	10323 27.25	10423 36.30
200 "	10224 36.30	10324 40.85	10424 54.45
400 "	10225 81.70	10325 82.50	10425 107.25
575 Volts—AC Fusible			
30 Amp.	10261 \$16.35	10351 \$19.95	10451 \$24.50
60 "	10262 17.25	10352 20.90	10452 26.30
100 "	10263 27.25	10353 31.75	10453 41.75
200 "	10264 42.65	10354 52.65	10454 63.50
400 "	10265 90.75	10355 103.55	10455 128.00
Not Fusible.			
230 V.-AC. D.C. 575A.C. ArcChok			
30 Amp. 230 Volts only.		13221 \$11.35	13241 \$16.35
30-60 Amp.	13222 \$ 9.55	13252 15.90	13242 21.80
100 "	13223 18.15	13253 24.05	13243 31.75
200 "	13224 25.40	13254 34.50	13244 46.30
400 "	13225 54.45	13255 62.50	13245 107.25
Not Fusible.			
600 V.-AC/DC			
30-60 Amp.	13262 \$12.70		
100 "	13263 20.40		
200 "	13264 27.65		
400 "	13265 66.25		

COMPENSATOR SWITCHES
Bulldog Quick Make & Break Fusible

Amps.	230 Volt AC		
	3 Pole	4 Pole	
30 A.	30321 \$16.35	30421 \$ 25.40	
60 A.	30322 20.40	30422 26.30	
100 A.	30323 28.15	30423 47.20	
200 A.	30324 46.30	30424 65.35	
400 A.	30325 86.00	30425 118.80	
Amps.	575 Volts AC Arc Chokers		
	3 Pole	4 Pole	
30 A.	30351 \$23.10		
60 A.	30352 23.60		
100 A.	30353 37.20		
200 A.	30354 54.90		

MOTOR STARTERS
Bulldog

	3 Pole	4 Pole
30 Amp.—Type A—230 Volts AC.	40321 \$16.35	40421 \$22.70
60 "	40322 22.70	40422 31.75
30 "	40341 22.70	40441 31.75
60 "	40342 32.70	

NOTE: For Bulldog Switches not listed deduct 10% from Bulldog Lists.

SMALL ENTRANCE SWITCHES
Columbia, 30 Amp.

Description		3 Pole
Single Fused	Single Blade-125 Volt-Plug Fused	320-321 \$1.50
Double	Double " " " "	1930 1.25
"	" " " "	3950 1.90
"	" " " " Cartridge Fused	322 2.35
"	" " " " Cartridge Fused	422 2.50
Description		3 Pole
Single Fused-Single Blade-125 Volt-Plug Fused		
Double	Double " " " "	1931-3 \$2.15
"	" " " "	3931-2 2.45
"	" " " " Cartridge Fused	323 4.00
"	" " " " Cartridge Fused	423 4.40

These prices apply only to the United States

Electrical Contracting, March, 1932

ENTRANCE SWITCHES

Range and Lighting		Columbia	3 Pole 125-250 Volt
Cat.	No. Amp.	Branches	Price
3551	60	1-30A-1-60A. 250V. N. E. C. Fused & 2-30A. Plug Fused	\$34.60
3552	60	1-30A-1-60A. 250V. " " " " 4-30A. " " " " 6-30A. " " " "	35.40
3553	60	1-30A-1-60A. 250V. " " " " 6-30A. " " " "	38.60

BRANCH CIRCUIT ENTRANCE SWITCHES

Columbia

30	2	4	6	8
Amp.	Circuit	Circuit	Circuit	Circuit
2401 to 2406	\$3.90	\$4.90	\$5.20	\$5.85
3401 to 3406	4.90	6.20	6.50	7.15
3501 to 3506	4.75	5.85	6.20	7.50

Series 30—Quick Break—250 Volts for Meter Trims

For Cartridge Fuses

30 Amp.	60 Amp.	100 Amp.	200 Amp.
3022	3025	3028	3031
3023	7.50	3026	3022

INDUSTRIAL SWITCHES

Columbia

Series 70 Type C Fusible		
Amps	2 Pole	3 Pole
250 Volts	30A C7001 \$ 9.30	C7002 \$11.30
Fusible	60A C7004 12.00	C7005 15.50
Quick Make	100A C7007 18.85	C7008 23.65
& Break	200A C7010 27.95	C7011 34.65

Series 70 Type A Fusible		
Amps	2 Pole	3 Pole
250 Volts	30A A7001 \$10.30	A7002 \$12.85
Fusible	60A A7004 13.10	A7005 17.30
Quick Make	100A A7007 21.45	A7008 27.50
& Break	200A A7010 30.50	A7011 38.35

Series 71-500 Volts Fusible		
Amps	2 Pole	3 Pole
500 Volts	30A 7101 \$13.60	7102 \$15.50
Quick Make	60A 7104 14.00	7105 16.00
& Break	100A 7107 23.50	7108 26.65
250 Volts	200A 7110 37.70	7111 42.25

Series 72-600 Volts Fusible		
Amps	2 Pole	3 Pole
600 Volts	30A 7201 \$14.00	7202 \$16.05
Quick Make	60A 7204 14.60	7205 16.60
& Break	100A 7207 24.10	7208 27.15
250 Volts	200A 7210 38.60	7211 42.65

Series 74-600 Volts Unused		
Amps	2 Pole	3 Poles
Quick Break Only	2022 \$ 5.10	2023 \$ 6.85
60A	2025 6.85	2026 7.90
100A	2028	

S-Sundries

S-SUNDRIES

MACHINE SCREWS—Round or Flat Head

Size	Price per Dozen		Size	Price per Dozen	
	Iron	Brass		Iron	Brass
1/4 x 1/2	.04	.07	10/24 x 1/2	.05	.10
1/4 x 1/2	.04	.08	10/24 x 1	.05	.10
1/4 x 1/2	.04	.09	10/24 x 1 1/2	.05	.10
1/4 x 1/2	.04	.11	10/24 x 1 1/2	.06	.10
1/4 x 1/2	.04	.11	14 x 20—1/2	.07	.15
1/4 x 1/2	.04	.11	14 x 20—1	.08	.10
1/4 x 1/2	.04	.12	14 x 20—1 1/2	.09	.14
1/4 x 1/2	.04	.14	14 x 20—1 1/2	.10	.19

NOTE—For Machine Screws with Fillister Head add 25% to above prices.

LAG SCREWS

Square Heads or Coach Screws

Length	Price Each						
	2"	2 1/4"	3"	3 1/4"	4"	4 1/4"	5"
1/4 Black	.03	.03	.04	.04	.04	.04	.05
1/4 Black	.03	.04	.04	.04	.05	.05	.06
1/4 Black	.04	.04	.05	.05	.06	.06	.07
1/4 Black	.05	.05	.06	.07	.07	.07	.09
1/4 Galv.	.03	.03	.04	.04	.05	.05	.06
1/4 Galv.	.04	.04	.04	.04	.05	.05	.06
1/4 Galv.	.06	.06	.07	.07	.08	.08	.09

STRAPS—CLIPS OR CLAMPS

For Pipe

	Price Each					
	1/4"	1/2"	3/4"	1"	1 1/4"	2"
Without Screws	.01	.01	.01	.01	.01	.02
Galvanized Straps, 2 Hole.....	.01	.01	.01	.01	.01	.02
(Per Pound \$.20) No. Straps per Lb.....	.45	.40	.25	.20	.13	
Light Steel Straps, 1 Hole.....	.04	.05	.06	.08	.10	
Mall. Iron Clamps, 1 Hole.....	.04	.05	.06	.08	.12	
P & S Conduit Clamps with Bolts—Series 1400.....	....	.10	.14	.18	.20	
Without Screws	.02	.02	.02	.02	.02	.03
Galvanized Straps, 2 Hole.....	.02	.02	.02	.02	.02	.03
(Per Pound \$.20) No. Straps per Lb.....	.12	.07	.05	.04		
Light Steel Straps, 1 Hole.....	.18	.35	.50	.65		
Mall. Iron Clamps, 1 Hole.....	.25	....	....	....

SOLDER

Per Pound	40-60	50-50	Resin or Acid	Ribbon	Allen	Alumi-
	Bar or	Bar or				
Wire	\$.65	\$.70	\$.85	\$.75	\$ 2.00	
Per Ounces	.05	.05	.08	.07	.15	

SOLDER PASTE

Make	2 oz.	2 oz.	4 oz.	Pound	Half	One
					Cans	Tubes
Allen	\$.25	\$.40	\$.50	\$.70	\$ 1.25	
Buraley	.20	....	.30	.40	.65	
Crescent	.25	....	.40	.65	1.00	
G. E.	.25	....	.40	.90	1.50	
Highland	.40	....	....	.90	1.65	
Nokorode	.25	....	....	.90	1.50	
Star	.28	....	.40	.65	1.00	

SOLDERING SALTS

	1/4 Lb.	1 Lb.
Burnley	16 cans each	\$.40
Yager	16 cans each	\$.75
McGill Crescent	In Bottles each	.85
Nokorode	In cans each	1.00
Allen	In Bottles each	.75

SOLDER STICKS

	Price
Burnley	\$.25
Samson	.20
Allen	.40
Crescent	.25
GE	.25
Star	.25

FIXTURE STUDS

	%	%
Four Prong Fixture Studs Less Bolts	\$ 1.10	\$ 1.15
Bolts Extra	.01	.01
No Bolt Fixture Studs	.10	.15

STAPLES

Staples Insulated Nails Per Dozen	Per Box	
.05	of	.40
.05	100	.40

TAPE

FRICTION	Price Per Roll				
	8-Ounce	4-Ounce	2-Ounce	1-Ounce	Per Foot
Adhere	\$.25	\$.15	\$.10	\$.05	\$.01
Amazon	.35	.20	.10	.05	.01
Bulldog	.40	.20	.10	.05	.01

These prices apply only to the United States

Time Switches

Clifton	.35	.20	.10	.05	.01
Dutch Brand	.35	.20	.10	.05	.01
G. E. 361	.30	.20	.10	.05	.01
Grimshaw	1.00	.50	.25	.15	.03
Highest Firestone	.30	.15	.10	.05	.01
Holdfast	.25	.15	.10	.05	.01
Holdrite U. S.	.30	.15	.10	.05	.01
Johns Manville Armature	.90	.45	.25	.15	.02
Johns Manville White	.55	.30	.15	.10	.02
Johns Manville #45	.25	.15	.10	.05	.01
Manson	.60	.30	.15	.10	.02
O. K.	.30	.15	.10	.05	.01
P & B.	.35	.20	.10	.05	.01
Security	.25	.15	.10	.05	.01
Slipknot	.30	.15	.10	.05	.01
Two Plex	.65	.35	.20	.10	.04
Vim Gray	.60	.30	.15	.10	.02

RUBBER					
Akron Firestone	\$ 0.30	\$ 0.15	\$ 0.10	\$ 0.05	\$ 0.03
Amazon	.50	.25	.15	.10	.04
Dutch Brand	.30	.15	.10	.05	.03
G. E. 362	.30	.15	.10	.05	.03
Imperial	.30	.15	.10	.05	.03
Okonite	.75	.40	.20	.10	.04
Paragon	.55	.45	.25	.15	.04
P. R. Splicing	.30	.15	.10	.05	.03
Relio U. S.	.25	.15	.10	.05	.03
Security	.30	.15	.10	.05	.03
Twoplex	.65	.35	.20	.10	.04
U. S.	.25	.15	.10	.05	.03
USCO	.60	.25	.15	.10	.04

TELEPHONES

COUCH TELEPHONES

Vestibule Type
No. 74 Armored Cord Receiver Type.....
No. 74A Swing Arm Receiver Type.....
No. 74C Cordless Loud Speaker Type.....
Above prices are for telephones complete but do not include any call buttons.
Add for buttons—Janitor Calling Buttons if fitted.....
Add for Each Suite Calling Button.....

\$25.00
37.30
30.75

Add for buttons—Janitor Calling Buttons if fitted.....

\$0.95

Add for Each Suite Calling Button.....

3.25

SUITE TELEPHONES

Series 2800 to 2849 or 1909 to 49

Page 22 Bulletin No. 80 S. H. Couch Co.

Number of Buttons..... 0 1 2 3

Price Ea. Surface or Flush \$11.40 \$11.40 \$12.45 \$13.00

TELEPHONE CABLES

Number of Conductors..... 8 12 16 21 25 31 37

Braided Type "B"..... \$1.14 \$1.54 \$1.82 \$2.22 \$2.52 \$2.82 \$3.12

Lead Covered Type "L"..... L-8 L-12 L-16 L-21 L-25 L-31 L-37

Number..... 8 12 16 21 25 31 37

Price per Foot..... \$1.14 \$1.54 \$1.82 \$2.22 \$2.52 \$2.82 \$3.12

Number..... 8 12 16 21 25 31 37

Price per Foot..... \$1.14 \$1.54 \$1.82 \$2.22 \$2.52 \$2.82 \$3.12

Number..... 8 12 16 21 25 31 37

Price per Foot..... \$1.14 \$1.54 \$1.82 \$2.22 \$2.52 \$2.82 \$3.12

Number..... 8 12 16 21 25 31 37

Price per Foot..... \$1.14 \$1.54 \$1.82 \$2.22 \$2.52 \$2.82 \$3.12

Number..... 8 12 16 21 25 31 37

Price per Foot..... \$1.14 \$1.54 \$1.82 \$2.22 \$2.52 \$2.82 \$3.12

Number..... 8 12 16 21 25 31 37

Price per Foot..... \$1.14 \$1.54 \$1.82 \$2.22 \$2.52 \$2.82 \$3.12

Number..... 8 12 16 21 25 31 37

Price per Foot..... \$1.14 \$1.54 \$1.82 \$2.22 \$2.52 \$2.82 \$3.12

Number..... 8 12 16 21 25 31 37

Price per Foot..... \$1.14 \$1.54 \$1.82 \$2.22 \$2.52 \$2.82 \$3.12

Number..... 8 12 16 21 25 31 37

Price per Foot..... \$1.14 \$1.54 \$1.82 \$2.22 \$2.52 \$2.82 \$3.12

Number..... 8 12 16 21 25 31 37

Price per Foot..... \$1.14 \$1.54 \$1.82 \$2.22 \$2.52 \$2.82 \$3.12

TIME SWITCHES—Continued

TYPE T-13 ELECTRICALLY OPERATED

With Plain Dial				Two Adjustable Riders				
Volts	Amp.	Pole	Switch	Model Number	60 Cycle	50 Cycle	25 Cycle	Price
115	30	1	1	3T13AA2	3T13AA9	3T13AA11	\$25.00	
230	15	1	1	3T13AA2	3T13AA4	3T13AA6	26.00	
115	30	2	1	3T13CA7	3T13CA9	3T13CA11	28.00	
230	15	2	1	3T13CA2	3T13CA4	3T13CA6	29.00	

With Plain Dial				Two Moving Riders			
115	30	1	1	3T13AB7	3T13AB9	3T13AB11	\$40.00
230	15	1	1	3T13AB2	3T13AB4	3T13AB6	41.00
115	30	2	1	3T13CB7	3T13CB9	3T13CB11	43.00
230	15	2	1	3T13CB2	3T13CB4	3T13CB6	44.00

TWO-CIRCUIT SWITCH

With Plain Dial				With Astronomic Dial			
115	30	1	1	3T13EA7	3T13EA9	3T13EA11	\$31.00
230	15	1	1	3T13EA2	3T13EA4	3T13EA6	32.00
115	30	2	1	3T13EB7	3T13EB9	3T13EB11	46.00
230	15	2	1	3T13EB2	3T13EB4	3T13EB6	47.00

HARTFORD TIME SWITCHES

Type	10	20	35	50
	Amp.	Amp.	Amp.	Amp.
Type B Double Pole	\$36.00	\$39.00	\$42.00	\$50.00
C & D Double Pole	39.00	42.00	47.00	52.00
G Apt. Hall Light Control D. P.	38.00	40.00	.....	.....

HOROLECTRIC TIME SWITCHES

Type	Wound Capacity	Description		Price
E	Elec. 60 Amp.	Double Pole		\$32.00
H	Hand 60 "	Same as Type E & H on a Mounting Plate in Weatherproof Box		24.00
EW	Elec. 60 "	With Automatic Cutout for omitting operation on Sunday or any day desired		42.00
HW	Hand 60 "	With Automatic Cutout for omitting operation on Sunday or any day desired		34.00
EO	Elec. 60 "	With Automatic Cutout for omitting operation on Sunday or any day desired		38.00
HO	Hand 60 "	With Automatic Cutout for omitting operation on Sunday or any day desired		30.00
EOW	Elec. 60 "	With Automatic Cutout for omitting operation on Sunday or any day desired		48.00
HOW	Hand 60 "	With Automatic Cutout for omitting operation on Sunday or any day desired		40.00
ET	Elec. 60 "	With automatic day cutout and four operations per day		35.00
HT	Hand 60 "	With automatic day cutout and four operations per day		27.00
ETW	Elec. 60 "	Equipped for Four Operations per day, Two "Ons" and Two "Offs" in 24 hours		45.00
HTW	Hand 60 "	Equipped for Four Operations per day, Two "Ons" and Two "Offs" in 24 hours		37.00
ETO	Elec. 60 "	With automatic day cutout and four operations per day		42.00
HTO	Hand 60 "	With automatic day cutout and four operations per day		34.00
EM	Elec. 30 Amp.	Single Pole, Double Throw, for operating large open circuit switches		38.00
HM	Hand 30 "	Single Pole, Double Throw, for operating large open circuit switches		30.00
EMW	Elec. 30 "	Single Pole, with special contact for connecting automatic electric time motor		48.00
HMW	Hand 30 "	Single Pole, with special contact for connecting automatic electric time motor		40.00
EC	Elec. 30 "	Single Pole, with special contact for connecting automatic electric time motor		35.00
HC	Hand 30 "	Single Pole, with special contact for connecting automatic electric time motor		27.00
ECW	Elec. 30 "	Single Pole, with special contact for connecting automatic electric time motor		45.00
HCW	Hand 30 "	Single Pole, with special contact for connecting automatic electric time motor		37.00
E—Electrically Wound		W—In Weatherproof Box		
M—Single Pole, Double Throw		H—Hand Wound		
O—With Automatic Day Cutout		T—For Four Operations per Day.		

PARAGON

Type	10 A	15 A	20 A	30 A	40 A	50 A
A	Sgle. Pole	125 V.—A. C.	.....	\$22.00	.....	.....
B	Dble. "	250 V. A. C. or D. C.	.....	\$25.00	.....	\$35.00
SA	Sunday Cutout	125 V.—S. P.	.....	26.00	.....	.....
SB	"	250 V.—D. P.	.....	40.00	.....	.....
TB	Two Circuit 125 V.	.....	30.00	.....	33.00	.....
C	Sgle. Pole	115 V. AC 50-60 Cy.	.....	30.00	.....	.....
K	Dble. "	115 V. AC 50-60 "	.....	50.00	.....	.....
TK	Two Circ. 110-250 V.	50-60 "	40.00	.....	45.00	.....
D	Dble. Pole	110 V. V.	50-60 "	.....	45.00	45.00
E	Sgle. "	50-60 "	.....	50.00	.....	65.00
F	Dble. "	115 V.	50-60 "	.....	65.00	65.00
TF	Two Circ. 115 V.	50-60 "	55.00	.....	60.00	.....

RELIANCE & RACINE SWITCHES

	10 Amp.	20 Amp.	30 Amp.	50 Amp.
Racine Type 1R-2R	\$19.50	\$23.00	.....	.....
Reliance Type 10-20-30-50	28.00	30.00	\$32.00	\$36.00
Reliance Type 15 Triple Pole	.....	33.00	.....	.....
Apartment House Types A-B-C-D-E-F-G	30.00	30.00	.....	.....

SANGAMO TIME SWITCHES

No.	115V. AC	230V. AC	115V. DC	230V. DC
TCorTM-11 Sgle.	Sgle. 30	\$50.00	30 \$50.00	30 \$56.00
TC " TM-12 "	Dble. 30	53.00	30 53.00	30 59.00
TC " TM-21 Dble.	Sgle. 30	56.00	30 56.00	30 62.00
TC " TM-22 "	Dble. 30/10 59.00	30/10 59.00	30/10 65.00	15/5 68.00
TM-31 Triple Sgle.	5	62.00	5 68.00	5 71.00
TM-32 "	Dble. 5	65.00	5 71.00	5 74.00
Form V.W. 11	Sgle.	40	25.00	40 40.00
" V.W. 21	"	40	27.50	40 27.50

TRIPLEX

No.	Poles	Throws	Amp.	Price	Amp.	Price
1	Sgle.	20	20	201	\$25.00	201W
2	"	20	40	402	30.00	402W
3	"	20	60	603	35.00	603W
4	"	20	80	804	40.00	804W
1	Dble.	20	20	202	30.00	202W
2	"	20	40	404	40.00	404W

These prices apply only to the United States

Electrical Contracting, March, 1932

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UMI

TORK

Synchronous and Large A. C. Types				Hand Wound and Large D. C. Types				
Amp.	Pole	Indoor	Outdoor	Amp.	Pole	Indoor	Outdoor	
20	1	\$121	\$30.00	221	\$38.00	221H	\$30.00	
20	2	122	35.00	222	43.00	222H	37.00	
20	3	123	40.00	223	48.00	223H	45.00	
40	1	141	35.00	241	43.00	241H	35.00	
40	2	142	45.00	242	53.00	242H	45.00	
60	1	161	45.00	261	53.00	261H	45.00	
60	2	8062	75.00	Omitting	60	2	7062	97.00
125	2	8122	135.00	Device	125	2	7122	142.00
200	2	8202	160.00	Included	200	2	7202	172.00
20	1 & 1	1211	40.00	2-Circuit	20	1 & 1	1211H	32.00
20	2 & 2	1222	40.00	Apartment	20	2 & 2	1222H	42.00
40	1 & 1	1411	50.00	Types	40	1 & 1	1411H	42.00
20	1 & 1	1111	40.00	Mom. Cont.	20	1 & 1	1111H	32.00
20	1 & 1	1171	40.00	Motor Cont.	20	1 & 1	1171H	32.00

On and Off Twice-a-Day \$2.00 Extra—3 to 16 Times Per Day \$5.00 Extra.

MARK-TIME SWITCH

Type	A Model	15-S & 3M	Switches & Plates	(Regular)	\$2.50
A	*	*	*	(Automatic Return)	2.50
B	*	*	*	(2 Terminal Type)	4.25
B	*	*	*	(3)	4.50

TRANSFORMERS

BELL & TOY TRANSFORMERS

Name	Style	Secondary Watts	Cycle No.	50 to 133		25 to 40	
				Price	No.	Price	No.
Midget	8	201	\$1.00	201	\$1.30	201
Tri-Volt	6-8-14	281	1.30	281	1.55	281
Ace	8	280	1.30	280	1.55	280
M-26	8	1211	1.40	1211	1.75	1211
T-26							

AMERICORE RUBBER COVERED WIRE

IN CINCINNATI'S BIGGEST STRUCTURE



IN the building of the Carew Tower, located in Cincinnati, Ohio, every worth-while development in modern architecture and building science has been incorporated. Designed as a monument to beauty, utility and efficiency, its material specifications called for only proved and tested products. In line with this policy Americore Rubber Covered Wire was specified throughout—its selection based on excellent quality, constant uniformity and the known dependability of its manufacturer. In your own case—detailed information and estimates will be furnished promptly.

SEND FOR OUR HANDBOOK ON
ELECTRICAL WIRES AND CABLES

**THE
CAREW TOWER
CINCINNATI, OHIO**

Architect:
Walter W. Ahlschlager
Associate
Architects:
Delano & Aldrich
General
Contractor:
Starrett Bros., Inc.,
Electrical
Contractor:
Hatfield Electric Co.,
Inc.

1831 1932

AMERICAN STEEL & WIRE COMPANY

208 South LaSalle Street, Chicago

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

And All Principal Cities

Pacific Coast Distributors: Columbia Steel Company, Russ Building, San Francisco

Export Distributors: United States Steel Products Company, New York

EDITOR'S MAIL

(Continued from Page 34)

which gave me $50 \times 21.6 \times 15$ over X (drop) equals 4107 (c.m. of No. 14) equals 3.94 volts loss. Wire size in c.m. =

$21.6 \times \text{amps} \times \text{length in ft.}$

drop.

Taking 110 volts as a basis—110 volts \times 15 amp. equals 1650 watts; 110 volts minus 3.94 (loss) \times 15 amps. equals 1590.90 watts. Then 1650 minus 1590.90 equals 59.1 watts loss. And following the same procedure for 25 amp. load I find 164.25 watts loss, or almost three times as great a loss at less than twice the load.

True, the average tenant or owner would not notice a slightly lower light intensity, and it probably would be quite a problem to convince him of a saving by remedying the condition. But, when we consider toasters, household irons, waffle irons, curlers, heaters, etc., we begin to get a different view of things. With little thought we begin to see where several tenants can subject No. 14 wire to a 25 amp. and possibly a 30 amp. load.

For the remedy. I replaced 210—20, 25, and 30 amp. fuses—with 15 amp. fuses. Now, if a fuse blows there must be a reason, and the cause if possible should be ascertained, at the same time informing tenants that the wiring system is properly protected as to safety, and it will be necessary to turn off lights not needed, at least when using irons and the like. Then when tenants begin to realize the fact they will find their irons, etc., heating more quickly, and thereby making a noticeable difference in owners light bill also. Then if fuses continue to blow it will be evident that separate circuits for appliances will be required—or new tenants, as the case might be.

BERNARD HILLER,
B. Hiller Electric Co.
Rockford, Mich.

This situation is particularly apt to happen in houses that were wired before the war. One and two circuit jobs were quite the thing. In every one of those cases, the customer who is trying to use enough light for today's standards is losing money. Have other readers had any similar experiences with over-fusing? We shall be glad to hear of them.—EDITOR.

Sure!



BlueBell DOOR BELL TRANSFORMERS

“You can depend on ‘em!”

Ask the old experienced contractor what he thinks of *BlueBell* transformers. He knows! He'll tell you that they are *dependable*—and that means a lot in an item of this kind. He's probably tried others years ago. Grief? Not since he switched to *BlueBells*. All the grief and trouble is built out of them. Eighteen years manufacturing experience has done that. Why experiment when you *know* you can depend on *BlueBells*?

GreyBell
TRANSFORMERS

Outlet box transformer—just as sturdy—just as dependable as the *BlueBell*.

Write for Price Sheet

**Always ask for them
by Name**

KILLARK
ELECTRIC MANUFACTURING
COMPANY

3940 Easton Avenue
St. Louis, U. S. A.

Look Inside RIGID



Recent important developments in G-E WHITE rigid conduit make it an outstanding value.

GENERAL  ELECTRIC
RIGID CONDUIT

MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONNECTICUT

CONDUIT

FOR QUALITY

G-E WHITE rigid conduit is protected as well inside as out

If you want to judge the quality of rigid conduit, look inside of it. See if it is as good inside as it is outside.

For protection against rust and corrosion, a coating of zinc has been found to be best. And the zinc is needed not only on the outside but even more on the inside. Nearly every run of conduit is exposed to the action of condensate, which gathers in low spots on the interior.

Be sure, therefore, that the conduit you use is protected with a coating of zinc that is as heavy on the inside as on the outside. To get this heavy coating inside, use only hot-dipped galvanized conduit. When the entire pipe is dipped in hot zinc, the zinc flows through the pipe, becoming alloyed with the steel both inside and outside.

G-E WHITE rigid conduit is Hot-Dipped Galvanized. That is one of the reasons for its well-known long life.

Notice the Smooth Interior

When you are sure your conduit is well protected inside, be sure, also, that

it is smooth inside so that your work in pulling wires will be made easier.

G-E WHITE is made by an exclusive process that leaves the zinc coating smooth inside. In addition, a coating of Glyptal is baked on, both inside and out, giving the conduit a surface of glass-like smoothness.

The Glyptal, a product of the G-E Research Laboratories, also resists moisture, oil, acids, and alkalies, thus adding years to the life of the conduit.

Bend a Length of G-E Conduit

Test a length of **G-E Conduit** yourself for easy-bending. Bend it across your knee. See for yourself that it actually is easier to work. And then figure how much it would save you in trouble on installations. You can save on installation costs, because it cuts, threads, and bends so readily.

Stocks of **G-E WHITE** are carried by G-E Merchandise Distributors in all parts of the country. Take your conduit problems to one of them, or write to Section C-323, Merchandise Department, General Electric Company, Bridgeport, Conn.

GENERAL ELECTRIC
RIGID CONDUIT

MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONNECTICUT

CONTRACTING

news

INFORMATION OF INTEREST TO ELECTRICAL CONTRACTORS
CONSISTING OF ITEMS OF NEWS, SHORT ARTICLES, PRACTICAL
IDEAS, ETC., OUR READERS ARE INVITED TO CONTRIBUTE TO
THIS DEPARTMENT

REINSPECTION OF DISCONNECTS IN TOLEDO

In order to properly enforce re-inspection in Toledo, Ohio, the following ruling has been passed by the electrical inspection department of that city:

"Any building that has been disconnected from electrical service cannot be reconnected without first having been re-inspected by this department. All wiring that is found at the date of re-inspection contrary to our national and city code, or made defective by abuse, must be brought up to the latest code. Where wiring has been installed to a previous code and found safe (that is with no surrounding hazards) same can be connected upon re-inspection by this department".

PROBLEMS FOR LOS ANGELES ESTIMATORS

The Electrical Estimators of Southern California, an outgrowth of what was formerly the Estimators Section of the Southern California Electragists, continues to hold weekly noonday luncheon meetings. Problems arising out of the everyday estimating work are discussed informally by members at these meetings.

W. L. Hyde, who is chairman of the program committee, announced a series of four programs for March which bid fair to be of unusual practical value. Mr. Hyde will prepare a given problem for each meeting, involving the estimating of the man-hours required in doing a certain piece of work where a given group of materials are used. As an example, one time it will involve the in-

stallation of conduit, boxes, etc. He will distribute to the members ruled sheets in advance of the meeting on which they will enter their estimates of the man-hours required for the different operations and the total. These are to be handed in, not signed, and are to be discussed at the meeting in an attempt to find out causes for particularly high or low estimates. All will learn considerable from this discussion. Later on the sheets for each problem will be averaged, and something in the nature of a typical estimate for each problem will be arrived at. These will be photostated and given to the members.

KANSAS CITY ELECTRICAL FIRES

There were 97 fires due to defective wiring in Kansas City, Mo., in 1931 as against 78 in 1930, according to a recent report issued by the Electric & Radio Association of Kansas City. A total of 170 fires in 1931 compares to 152 in 1930, showing the following causes: 97 from defective wiring; 35 from overheated irons; 27 from motors; 8 from appliances, and 3 from miscellaneous sources.

BOSTON PLANS FOR UNEMPLOYMENT RELIEF

Measures to relieve unemployment in the electrical industry in the Boston area is one of the major activities planned for 1932 by the Boston Section of the Electrical Guild of North America. Other activities discussed for immediate attention at the annual meeting of this section are legislation requiring separation of sub-bids on state and city work; enforcement of rules similar to the Trade Practice Conference Rules; prosecution of an educational campaign directed toward the elimination of unwise and harmful features in the system of competitive bidding, and expansion of the fields within which the electrical contractor operates.



DIRECT CONVENTION ACTIVITIES:—The third annual convention of the Electrical Contractor-Dealers of Minnesota was this year sponsored by the Master Electrical Contractor-Dealers Association of St. Paul. The meetings were held January 28 and 29 at the Hotel Lowry, St. Paul, and the following officers and members took an active part in the activities: Left to right (rear row): A. Swanson, H. Roberts, C. A. Yares, R. Gumbold, A. Scheiderbauer and W. F. Lindberg. Front row: M. Paul, Otto Johnson (president of association), Paul Schorr, F. W. Hoeft, T. Valet and J. A. Fischler.

HART & HEGEMAN UNIT COMBINATIONS



Switch, Receptacle, Warning Light

THE NEW Chromium-finish 2-gang units have style-appeal to your customers — besides attractiveness and convenience in the groupings. Have ample capacity for modern electric appliances in: Kitchens for Refrigerators and motorized appliances; Breakfast Nooks for Toasters, Percolators and Waffle Irons; Bath Rooms for Heaters both built-in and portable; Laundries for Washing Machines and Ironers. These new Combinations, in capacities listed, are already being required in some localities.

Chromium-finish plates match bathroom and kitchen hardware in chromium; blend perfectly with pewter and butler's silver finishes now so popular for residential decoration.

SINGLE-GANG Flush Jewel Units, with brass or Bakelite Plates, combine Warning Light with Switch or Receptacle. Jewel glows when current is ON in cellars, attics or closets, or when flatirons or other appliances are plugged-in. Catalog data-sheet for the asking.

HART & HEGEMAN DIVISION
THE ARROW-HART & HEGEMAN ELECTRIC CO. HARTFORD, CONN.



You put
Dunco Midget
Relays to work on fire
alarm and signal systems

This little relay is supplied in 8 different arrangements of contacts so that it is applicable to a wide range of needs.

It is just as quiet as it is little—no hum on A. C. and absolutely no chatter. Base measure only $1\frac{7}{8} \times 2\frac{3}{4}$ in. Dunco's Bulletins on relays provide all the data you need plus wiring diagrams.



OLDEST CONTRACTOR IN ST. PAUL: C. T. Nimitz started in the electrical contracting business in St. Paul in 1888, and 38 years ago he did what was then a modern electrical wiring and lighting job in the biggest department store built in St. Paul. He and his brother also operated a place of business in New York and their firm put in the original electrical installation on the Statue of Liberty.

DUNCO *Business-getters*
for the contractor

Dunco Light-sensitive cell
 Units find hundreds of jobs
 to do in industry, in stores,
 in the home and...

... for the automatic control of lighting systems in schools, operating at varying intensities of natural daylight.

Neatly housed in an aluminum finished case, $6 \times 5 \times 3$, and operates on standard voltage, 110 volt, 60 cycles. Special units, both A. C. and D. C. operated can be supplied for other voltages; standard U X-112-A radio tube is used, but not supplied with the unit.

Immediate deliveries will be made and circuit diagrams will be sent promptly upon request.



\$30.00

STRUTHERS DUNN INC.
 133 N. JUNIPER ST. DUNCO PHILADELPHIA, PA.

The officers elected to serve during 1932 are A. J. Hixon, president; Wm. St. George, vice-president; Charles A. Rounds, secretary, and S. Osborne Wilkinson, treasurer.

The committees appointed are as follows:

Executive committee: A. J. Hixon, Charles A. Rounds, Wm. St. George, Edwin C. Lewis, A. L. Frank, C. C. Connor and S. Osborne Wilkinson; membership committee: J. J. Sullivan, chairman, W. F. Balcom, I. Friedman, Philip Gaston, Charles A. Rounds and A. J. Wolfe; finance committee: H. T. Cole, chairman, W. G. Carlisle, Charles Freed, M. H. Gens, W. D. Smith and S. O. Wilkinson; apprentice committee: J. F. Stanton, chairman, J. J. M. Smith and J. A. Feeley, and conference board, A. J. Hixon, president, H. T. Cole and J. F. Stanton.

NEW OFFICERS FOR CLEVELAND ASSOCIATION

The following officers were elected for 1932 at the annual meeting of the Electrical Business Association, Inc., Cleveland, Ohio on January 11: A. C. Kaestle, Heights Electric Co., president; and J. Scherger, Lee Road Electric Co.; W. Raney, Colonial Electric Co.; R. Kell, Kell Electric Co.; J. B. Morgan, Eggers Electric

"CENTRAL"

now offers the most complete
line of rigid conduit on the
market!



CENTRAL WHITE . . . an electro galvanized rigid steel conduit,—recognized as the standard of quality in galvanized conduit throughout the country.



CENLACO . . . a new hot dipped galvanized and lacquered rigid steel conduit,—easy to work and bend,—with exceptional corrosion-resisting qualities.



WHITENRED . . . a rigid conduit for severe conditions . . . a zinc coated conduit still further protected by a super-coating which is acid proof.



CENTRAL BLACK . . . a black enameled rigid conduit,—the surface of which will not crack, chip or flake under the most severe bending strains.

Write for booklet—"Central Conduit in Modern Building Construction"

CENTRAL TUBE CO.
PITTSBURGH, PA.

HERE IT IS!

The one that has been adopted as standard equipment by eleven leading gasoline pump manufacturers, AND more to follow—

Specified by electrical engineers of our largest oil companies—

Purchased by aggressive contractors because they too find many economies in using them—

A complete line of forty styles to select from reduces unnecessary fittings which permits a neater and more compact installation.

Brass screw covers. No screws or gaskets. Union connections. Heavy cast bodies.

For Gasoline Pumps,
Bulk Stations, Refineries,
Gaseous Locations.



the NEW KECKLEY

Explosion Resisting
Conduit Fittings
and
Control Switches

Underwriters Approved

Class 1, Group D—
Hazardous Locations

*Bulletin 40-C sent upon request.
We solicit your inquiries for special fittings.*

O. C. KECKLEY COMPANY

Manufacturers of

Conduit Fittings, Control Switches, Floodlights,
Underwater Lights, Street Lights, etc.

565 W. Washington Boulevard, Chicago, Illinois

CUT OUT AND MAIL

O. C. Keckley Company,
565 W. Washington Blvd., Chicago, Ill.
Please send me copy of Bulletin 40-C.

Name

City

State

Co., and C. Mayer, Royal Electric Co., vice-presidents.

The board of directors comprises of G. Malone, G. W. Malone Co.; T. C. Fowler, Reserve Electric Co.; J. Renn, Lee Road Electric Co.; J. Gerhardt, Gerhardt Electric Co.; F. Meister, Meister Electric Co.; H. Morlock, Reliable Electric Co., and J. Quigley, Lakewood Electric Co.

NO WAGE REDUCTION IN DENVER

In the December issue of Electrical Contracting an announcement was made that Local No. 68 composed of journeymen electricians of Denver, Colo. had accepted a 12½ per cent wage cut. C. B. Noxon, business agent of Local No. 68, has advised, however, that the journeymen have not accepted this wage reduction, and do not intend to do so unless something of a beneficial nature can be accomplished for the industry.

MAGAW HEADS MILWAUKEE ELECTRAGISTS

George Magaw of the Magaw Electric Co. was elected president of the Milwaukee (Wis.) Chapter of Electragists at its annual meeting held December 15, 1931. Fred Schermerhorn of the A. C. Electric Co. was elected vice-president and William Sorgel of the Sorgel Electric Co., secretary-treasurer.

In addition to the officers on the



HEADS MINNEAPOLIS ELECTRAGISTS:—Charles W. Arrick of the Standard Electric Service Co., Minneapolis, was elected president of the Minneapolis Electragists, at their recent annual meeting, succeeding Geo. P. Svendson. Mr. Arrick has been in the electrical business in Minneapolis since 1892 and has always been active in electrical organization activities.

Squirrel-Cage Motor Table (Seven Types)

Type	Standard Ratings* (Single Speed)†	Starting-Current	Starting-Torque**	App. Full-Load Slip	Typical Applications
RP1	1/10 to 400 h. p. 3 or 2-phase 25 to 60 cycles 110 to 2200 volts	May not necessarily meet N. E. L. A. recommendations. Power companies ordinarily require current-reducing devices on ratings of 7½ h. p. and larger.	Varies with the square of the voltage applied to the motor terminals: approximately 150% of full-load torque at rated voltage; 96% at 80% voltage; as low as 38% at 50% rated voltage.	3 to 5%	Group or individual drives, in machine shops, on machine tools, fans and blowers, compressors, centrifugal pumps—on any application where normal-torque motors are satisfactory.
RP2	7½ to 30 h. p. 3 or 2-phase 60 cycles 110 to 2200 volts	Within N. E. L. A. starting-current recommendations, hence within most power companies' limitations, and therefore suitable for starting directly across the line.	Approximately same as RP1 motors. As these motors can be started across the line at rated voltage, they can start considerably more load than RP1 motors started under reduced voltage.	3 to 5%	Same as standard squirrel-cage motors, type RP1.
RP3	40 to 100 h. p. 3 or 2-phase 60 cycles 220 to 2200 volts	Within N. E. L. A. starting-current recommendations, hence within most power companies' limitations, and therefore suitable for starting directly across the line.	Centrifugal pump service does not require heavy starting-torque. Therefore these motors have starting torque of 80% to 100% of full-load torque.	3 to 5%	Centrifugal pumps, agitators, fans and blowers, generator sets, and other applications requiring low starting-torque.
RP4	1½ to 30 h. p. 3 or 2-phase 60 cycles 110 to 2200 volts	Within N. E. L. A. starting-current recommendations, hence within most power companies' limitations, and therefore suitable for starting directly across the line.	About 200% to 250% of full-load torque.	3 to 5%	Crushers, plunger pumps, belt conveyors starting under load, large air compressors, large refrigerating machinery, mixers, and other applications requiring high starting-torque.
RP5	40 to 100 h. p. 3 or 2-phase 60 cycles 220 to 2200 volts	These motors have starting-currents above most power companies' limitations; hence, current-reducing starting-devices ordinarily used.	Varies with the square of the voltage applied to the motor terminals: approximately 200% to 250% of full-load torque at rated voltage; 130% to 160% at 80% voltage; 85% to 100% at 65% rated voltage.	3 to 5%	The logical motor to use for applications where the torque produced by RP1 motors is not sufficient. If the starting-torque of type RP5 motors under reduced voltage is too low for any application, Wagner slip-ring or Fynn-Weichsel motors should be used.
RP6	½ to 150 h. p. 3 or 2-phase 25 to 60 cycles 110 to 2200 volts	Low enough to start across the line.	About 300% to 350% of full-load torque.	7 to 12%	Punch presses, shears, bulldozers, metal-drawing operations, balers and other machinery equipped with flywheels or having flywheel effect.
RP7	1 to 30 h. p. 3 or 2-phase 25 to 60 cycles 110 to 550 volts	Lower than any other type of squirrel-cage motor. No current-reducing starting-devices used.	Approximately 250% of full-load torque.	15 to 17%	Elevators, cranes, hoists, dumbwaiters.

*In addition to ratings listed, Wagner builds special-frequency and special-voltage motors as special apparatus.

†These seven types are also available in 2, 3 or 4 speeds.

**All percentages given are for 4-pole 60-cycle motors only.

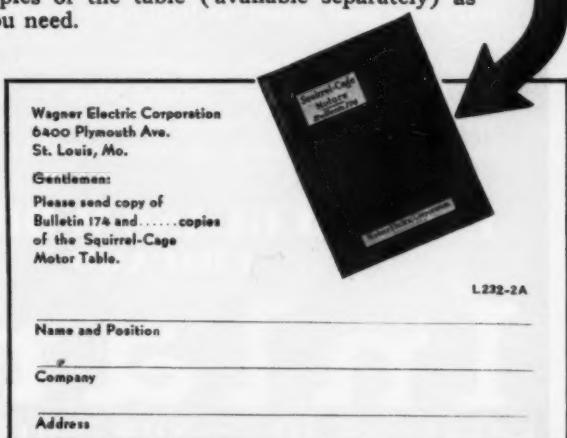
This Table will help you select the right motor for each job. It lists all the Seven Types of Squirrel-Cage Motors

ONE of these seven types of Wagner squirrel-cage motors has just the right characteristics to operate a punch press. Which one? Another type is intended for elevator duty. Again—which one? Fitting the right motor to the job is a task which more and more motor-users are placing in the hands of electrical contractors.

To help electrical contractors select the right motor for each job, Wagner has prepared the above table in addition to detailed description

of each type of motor—all of which is contained in Wagner's new Bulletin 174.

Ask for a copy of the bulletin and as many copies of the table (available separately) as you need.



Wagner Electric

Atlanta, Ga. Cleveland, Ohio Kansas City, Mo. Omaha, Nebr.
Baltimore, Md. Dallas, Texas Los Angeles, Calif. Philadelphia, Pa.
Boston, Mass. Denver, Colo. Memphis, Tenn. Pittsburgh, Pa.
Buffalo, N. Y. Detroit, Mich. Milwaukee, Wis. Portland, Ore.
Chicago, Ill. Houston, Texas Minneapolis, Minn. Salt Lake, Utah
Cincinnati, Ohio Indianapolis, Ind. New York City, N.Y. Seattle, Wash.
San Francisco, Calif. St. Louis, Mo. Toledo, Ohio

RETAIL STORES MUST SPEND NOW TO MODERNIZE



Inland ready to help you show merchants importance of Good Lighting

Keen merchants everywhere need new lighting equipment to successfully compete in the 1932 struggle for business. Restaurants are just one of the numerous businesses that have already been sold the idea of modern interiors. Those who are still going along, with furnishings of bygone days, will be forced by competition to modernize. Especially is this true of the lighting—the most important factor in drawing trade. Therefore, opportunity to sell lighting units is great. Lighting equipment offers one of the most profitable fields today. Contractors who realize this opportunity and are aggressive will make good money on lighting unit sales early in 1932.

Inland Glass will gladly cooperate with you. Our experience can be of value to you. Inland Glass has developed some very effective selling ideas. Let these sales plans go to work for you. Write at once for more complete details.

INLAND GLASS WORKS, Inc.
CHICAGO

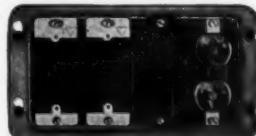
Inland
CREATORS OF "SNOW-WHITE" GLASS

board of directors, Bruno Barg of the Barg Electric Co. and H. C. Adolphsen of the Adolphsen Electric Co. were elected to the board.

BELLS AND BUZZERS MODERNIZED

The first line to be installed by electrical contractors—low tension devices for the home—succumbed to modernization with the announcement this month of a radical change in design and method of installation of bells and buzzers.

This development was made by Edwards & Company and will be marketed under the name of the "flushcall" line. The name comes from the fact that all of the units will be mounted flush in a standard switch box provided with standard toggle switch plates.



(Above) The transformer and two devices, each with a protecting grid, in a standard gang box with a 110-volt duplex receptacle.

(Below) The same installation with standard gang switch plate in place.



This new line is a decided departure from the recognized design and in order not to confuse it with bells and buzzers a new designation is used. Thus in place of the "bell" is "ringcall", for "buzzer" is "buzacall", "tucall" for the combination bell and buzzer, "melocall" a new single "ding" device for dining-room-kitchen call, and "powacall" for the transformer.

In addition, the new line includes an "annunciette" furnished with eighty-five different markings.

The new line has been designed from 8 to 12 volts, a.c. and may be combined with 110-volt receptacles and devices in a stand gang box. The complete line has been built on a co-ordinated design which gives the maximum flexibility of a thoroughly standardized system. Each element has been worked out with simplicity and ease of installation in mind.

ABSOLUTELY FREE

yours for the asking

a manual on the G-E FIBERDUCT System

(Write to the General Electric Co., Merchandise Dept., Bridgeport, Conn., for your copy)



ECONOMICAL
TO BUY

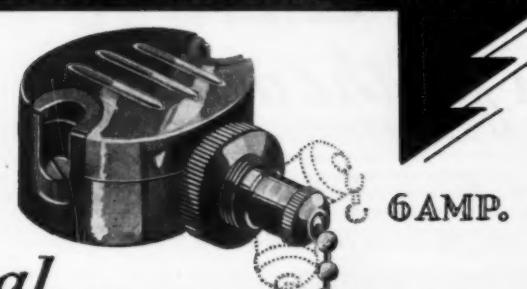
The non-corrosive underfloor wireway
that permits outlets for telephone,
buzzer, light and power circuits to
be installed at any point along
the line of the duct at any
time during the life of
the building
—economically
—quickly
—neatly
—safely

ECONOMICAL
TO INSTALL

GENERAL  ELECTRIC
FIBERDUCT

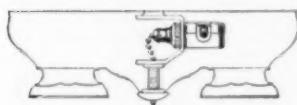
MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONNECTICUT

The ORIGINAL FIXTURE SWITCH



No.41 6 AMP.

Unusual Adaptability in the McGill Levolier



The six illustrations at the left show clearly what is meant when we say that the McGill LEVOLIER Switch has unusual adaptability.

For the pan type canopy, the LEVOLIER installs easily, no fuss, or bother. It remains firmly a part of the canopy itself.

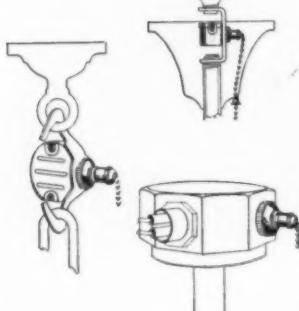


Shallow canopies have for a long time been troublesome . . . but the thin McGill LEVOLIER fits snugly into this type as you see at the left.

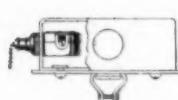
For ceiling fixtures, the LEVOLIER makes a rigid switch, permits straight down pull, and removes switching strain from the canopy.



Link Switch attachment installs easily, and is very practical where canopy switches are not required.



Insert the LEVOLIER in the knock-out of the conduit box.



Write for further information about the LEVOLIER No. 61 and 41 Switches, with full 6 ampere carrying capacity.

We'll be glad to send you the name of your nearest jobber.



MC GILL
MANUFACTURING CO.
Electrical Specialties of Quality
ESTABLISHED 1884
VALPARAISO - INDIANA

Box No. 670



SMALL STORE—BIG BUSINESS: — W. W. Lane, Augusta, Ga., has the smallest place of business in town, yet handles some of the biggest jobs. One of them included 5 miles of trench laid cable on a large South Carolina plantation with lighted golf course, hunting lodge, etc. He also does considerable telephone company work.

NORTH WESTERN N. Y. CONTRACTORS ELECT OFFICERS

The Electrical Contractors Association of North Western New York has elected the following officers for 1932: J. Wallace Eggleston, Albion, N. Y., president; Bert Miller, Medina, N. Y., vice-president; George W. Huntington, Brockport, N. Y., treasurer and Walter M. Hammond, Wilson, N. Y., secretary.

DISCUSS 1931 CODE CHANGES

Approximately 200 contractors and master electricians from all sections of Connecticut and Southern Massachusetts attended a meeting held at Hartford, Conn. on January 11 for the purpose of discussing the 1931 changes in the National Electrical Code.

The national code is used by city building inspectors in passing upon work done each year. However, in some cities in this section where no building inspector is appointed, the enforcement of this code rests with the individual contractor.

The meeting was addressed by Robert B. Shepard of the Underwriter's Laboratories of New York.

NIAGARA DISTRICT CONTRACTORS MEET

On January 21 the electrical contractors in the Niagara district met at dinner at the Hotel Leonard, St. Catherines, Ont. The meeting was presided over by J. H. Sandham, president of the St. Catherines Dis-



Beautiful Lighting Effects

ONE of the most unusual lighting effects ever accomplished with Appleton No-Thread Unilets and Electric Metallic Tubing, (Threadless Thin-Wall Conduit) is the building of the Niagara Hudson System at Olean, N. Y.

On the upper part of the building at night an interesting effect is produced by the variation in the porcelain socket diameters, and in the space between the lamp and the next socket, which is reflected on a stainless steel housing behind. The close-up photograph illustrates the long light troughs on the front and side of the building, which are also covered with a stainless steel housing. A very fine lighting effect is obtained.

The photograph in the upper left hand corner

illustrates the channels with Appleton No-Thread Unilets and Electric Metallic Tubing (Threadless Thin-Wall Conduit) installed, prior to each channel being separately placed in the stainless steel lighting columns.

This is another type of installation where Appleton No-Thread Unilets can save many hours of labor. There is no conduit threading to be done and they are easier to work with in cramped corners or varying lengths. And for such installations they are particularly valuable because the cadmium coating resists rust and corrosion, and the malleable iron gives greater strength with less weight.

This installation was designed by the Lighting Service Bureau of the Niagara Hudson Systems', Western Divisions in cooperation with Bley & Lyman, Architects, Buffalo, New York.

SOLD THROUGH JOBBERS

Appleton No-Thread Unilets for Threadless Thin-Wall Conduit are listed as Standard by Underwriters Laboratories
in $\frac{1}{4}$ -inch to 2-inch sizes, inclusive

APPLETON ELECTRIC COMPANY, 1704 Wellington Ave., Chicago, U. S. A.

New York—150 Varick St.

San Francisco—655 Minna St.

Los Angeles—340 Azusa St.

Manufacturers of Appleton Constant Duty and Portable Type Reelites

APPLETON

No-Thread Malleable

THE ORIGINAL THREADLESS CONDUIT FITTINGS

UNILETS

Reg. U. S. Pat. Off.

You Can Make Bends Quicker and Better with a GREENLEE



MANY contractors from coast to coast have learned from experience that Greenlee Hydraulic Conduit Benders are time and money savers, and that they make better bends than by any other method. In fact, it is not at all unusual to find that they more than pay for themselves on the first job.

When you use a Greenlee Conduit Bender, you have a tool that is portable and easy to take to the job. It makes smooth, even bends, which provide for the easy pulling in of wire and cable. Greenlee Benders are easy to operate, too, because the hydraulic principle provides for high bending pressure with very little effort on the part of the operator.

Don't start a new job without a Greenlee. Begin your investigation by letting us send complete information. No obligation, of course.

GREENLEE TOOL CO. ROCKFORD, ILLINOIS

GREENLEE TOOL CO., Rockford, Ill.

Please send complete information on the following:

- Benders for standard conduit.
- Benders for thin-wall steel conduit.

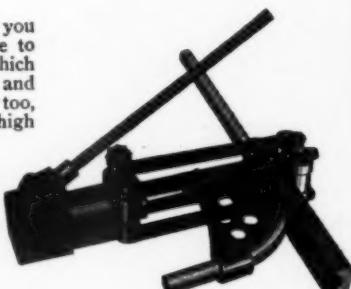
Name

Address

City

My Jobber is

3-32



strict Electrical Contractors Association, and among those in attendance were J. Culley and N. Crawford, president and secretary-treasurer respectively, of the Ontario Electrical Contractors Association, and several members of the Welland County Electrical Contractors Association.

Cyril Henderson of the Henderson Business Service, Ltd. of Brantford was the speaker of the evening.

The St. Catherines District Electrical Contractors Association is a branch of the Ontario Electrical Contractors Association and has been in operation approximately a year. The officers are J. H. Sandham, president; and F. Mackenzie, secretary-treasurer.

CONTRACTORS AND POWER COMPANIES COOPERATE

The members of the Jefferson County Chapter of Electragists, Birmingham, Ala. plan to continue in 1932 the work of the past two years of tying-in with the power companies to handle the installation work on the sales of the power companies, and the inside electrical work. In order to carry on this work effectively a standing committee composed of A. P. Bagby, R. C. Wiggins and D. B. Clayton handle all matters that come up between meetings and



TAKING UP AIR CONDITIONING:—S. C. Sachs, head of the Sachs Electric Company, St. Louis, Mo., is shown here after settling down in his new place at 817 N. Ninth St. His construction work runs to the kind which requires engineering and now he is going into the sale and installation of air conditioning systems in a big way, having proved to himself that this is a fine field for the electrical contractor.



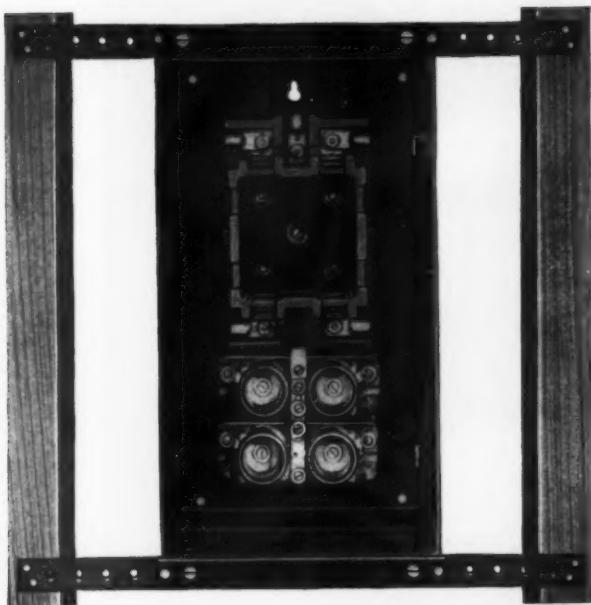
General Electric has a tape to meet the needs of every electrical requirement. The exacting standards as to the quality of materials used in General Electric products is your guarantee that G-E Friction and Rubber Tapes will give greater service and assure more lasting protection. Economical — G-E Tapes cost no more — use them on every electrical installation where dependable friction or rubber tape is required. Your nearest G-E Merchandise Distributor stocks a complete line of G-E Tapes. See him or write Section M-323, Merchandise Dept., General Electric Co., Bridgeport, Conn.



GENERAL ELECTRIC TAPES

MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONNECTICUT

RENU-FUSE PANELBOARDS



Bakelite
Pull-Cover

Catalog No. 64FN 2-60 Ampere N.E.C. and 4-30 Ampere Plugfuses. Flush type in roughed-in position. Dead Front and Pull Cover removed.

To the Contractors
who demand a

**GOOD—SAFE
Electric Product**

we recommend these
Panelboards.

They will help much
to eliminate disagreeable work and trouble.

Meet the most rigid
electrical requirements
and give entire satisfaction in use.

Panelboards are made
with 60 ampere, N.E.C.
Fuse Circuit and with
or without Plug Fuse
distribution. Can be
wired so that Renu-Fuse
Pull-Cover can be used
as disconnect for Branch
Circuits or as disconnect
for 60 ampere circuit.



**Catalog No. 64FN
With Aluminized Trim
Completely Installed**

The WADSWORTH ELECTRIC MFG. CO. INC.
Covington, Kentucky

make decision on questions that arise with the power company in its relations with chapter members.

EARNEST C. HEADRICK

Earnest C. Headrick for many years one of the leaders in association work among electrical contractors of Denver, died on February 8 at the age of 63 following a heart attack.

Mr. Headrick started in electrical work with George Westinghouse in his private laboratory at Pittsburgh in 1888. Twelve years later he went to France for the Westinghouse company as special representative and remained with that company until 1909, when he went to Denver and organized his own business as an electrical contractor.

Mr. Headrick for many years



E. C. HEADRICK

represented the Mountain States territory on the Executive Committee of the Association of Electragists, International. He was a past president of the Denver Electrical Contractors' Association and for many years also acted as its secretary. At the time of his death he was secretary of the Electrical League of Colorado.

Mr. Headrick was one of the first contractors to see the possibilities in specialization and for many years he specialized in chain store illumination.



A GENERAL CABLE PRODUCT



MORE PROFITS POSSIBLE

**SAFE
ECONOMICAL
SIMPLE TO INSTALL**

**AN APPROVED WIRING METHOD
OF WHICH MILLIONS OF FEET HAVE BEEN
INSTALLED SINCE ITS INTRODUCTION IN**

1922



ARMORED SERVICE ENTRANCE CABLE

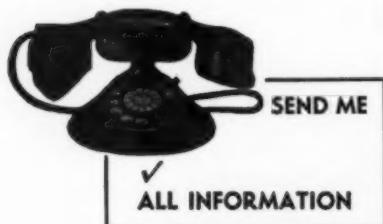
like RomeX, is another General Cable development, an approved wiring method. This material provides a more economical installation from weather-head to entrance switch making possible — more wiring sales — more appliance sales.

GENERAL CABLE CORPORATION

420 LEXINGTON AVENUE, NEW YORK CITY

OFFICES IN PRINCIPAL CITIES

SOMETHING NEW TO SELL

CHECK HERE . .
FOR A GOOD PROFIT

Sales on Strowger Auto-Com are up. Business needs this small, private, inexpensive telephone system for the time and steps it saves. Dealers are making a good profit—and you can have the same results in your own territory.

Strowger Auto-Com is a reliable system built by the originator of the dial telephone. Transmission is clear and distinct. Code Call and "special services" adapt it to schools, hospitals, small business houses. Just the right product for today's market.

Clip the coupon and send it with your letterhead for full details of the Strowger Auto-Com plan for your territory. American Automatic Electric Sales Company, 1031 W. Van Buren Street, Chicago, Illinois.

STROWGER AUTO-COM

Private Telephone System Made By
The Makers of Strowger P-A-X

██

Automatic Electric
Company

██

A
ROLL
O'
TAPE

ELECTRICAL FLASHES
GATHERED AMONG THE
BIG WIRE AND PIPE MEN

BY

COIT A. (DUKE) SMITH
AND WALTER HOLMES
FIELD EDITORS
ELECTRICAL CONTRACTING

THE Dixie Electric Company, Montgomery, Ala., has an excellent plan for encouraging their wiremen in soliciting additional business when called on a repair job. The men are paid one-half time while in the shop but full time while on the job. This encourages them to sell adequate wiring to the home owner, as they naturally get the additional work they create.

A YEAR ago H. R. Keppler, Brooklyn Electric Co., Cleveland, Ohio, installed an experimental electrical hotbed at the Benjamin Franklin School, with the co-operation of K. J. Hopp, instructor. This installation has demonstrated that the electrical hotbed is fully as effective as the ordinary kind and costs less to operate. Mr. Keppler says the experiment will be continued another year and he is now experimenting with a new type of hotbed, where the heat source will be lead-sheathed resistance wires running directly through the soil.

FULTON BROTHERS, Atlanta, are the only contractor-dealers in the downtown high rent section of this town of over 200,000 population.

ED KARST, Hintgen-Karst Electric Co., Fergus Falls, Minn., in a talk he gave at the annual meeting of the Southern Minnesota Electrical Association held recently, emphasized the importance of sending out properly qualified service men on all service calls. There are too many "fixers" who try to get by as service men.

VICTOR LEMOGE, Electragist of San Francisco, is beating the depression by getting himself a gold mine. He and four other fellows have got hold of a property and have the machinery ready for operation. I can't

remember whether Vic said that they had assayed an ounce of the ore and it ran \$500,000 dollars to the ton or whether he said they assayed 500,000 ounces which ran a dollar a ton. That is a detail that does not make much difference anyway, since there is no stock for sale. If you should hear of Victor Lemoge getting out of the contracting business some day, it will not be because he is not a mighty good contractor, but because he has an auriferous complex.

J. M. CLAYTON, Atlanta, is said to be the first contractor to install conduit in a cotton mill. Another unusual point is that one industrial plant has given him one million dollars worth of work during the time he has been in business. Now quite a few contractors have told me that the fellow who can sharpen his pencil the most always gets the job so I asked Mr. Clayton about this. "In industrial work," he told me, "the engineer wants high quality materials and good work. Price means nothing unless he is assured of quality."

THE Ohio Electrical Contractors' Association has had the Trade Practice Rules for the Electrical Contracting Industry printed on cardboard, 11 by 14 in., and punched for wall hanging.

THE Madison Electrical Contractors Association, Madison, Wis., has put in force a novel plan to secure the co-operation of the city architects in matters involving fair treatment of the electrical men. At each regular weekly meeting there will be an architect as a guest. The main subject to be discussed with him is that of "pre-opening" of electrical bids. This means that the architect will open the electrical bids in advance, consider them carefully and see that the work goes to the lowest responsible bidder.

THE same neighborhood in San Francisco for 30 years. That is some record. F. J. Bertrand started the company and he now has a son, J. Bertrand, in with him. They specialize in business with real estate firms who call upon them for repairs in the homes and apartments that they operate. About six such firms are serviced, the largest being Buckley-Thorne. The Bertrands are subject to call at any time to do any and all kinds of repair work.

R. F. MOMEIER, Charleston, S. C., was asked by a customer why he could not carry electrical goods to sell at the same prices charged by the ten cent stores. He gave an answer that sold and satisfied. "If your electrical goods from the ten cent store go bad, you don't expect the girl behind the counter to repair them for you," he said. "But if you buy from a contractor like myself you would insist that I repair

It's not what you pay

*- but what you get
for what you pay*



When you buy panelboards what do you want? Long-life? No-maintenance? Service? Safety? All those and more are qualities of **FA** Panelboards. They are not, necessarily, qualities of other makes, and none of them have *all* of **FA** Qualities. Choose then that which will give you the most for your dollar, that has a reputation that adds to yours and that is always the "Sign of a Better Job".

It's not what you pay but what you get for what you pay that counts.

To know the **FA** man is worthwhile. Ask him to cooperate with you and you will have well-informed experienced suggestions on switchboard and panelboard problems.



Frank Adam ELECTRIC COMPANY ST. LOUIS

Albuquerque, N. M.
General Engineering
and Equipment Co.,
108 N. Third St.
P. O. Box 76

Atlanta, Ga.
L. A. Crow,
64 Cone St., N. W.

Baltimore, Md.
Wolfe-Mann Mfg. Co.,
312 Hanover St.

Boston, Mass.
J. A. Cassidy,
221 Congress St.

Buffalo, N. Y.
Ralph E. Jones,
137 Saranac Ave.

Chicago, Ill.
Major Equipment Co.,
Inc.,
4603 Fullerton Ave.

Cincinnati, Ohio
E. F. Schurg,
105 E. Pearl St.

Cleveland, Ohio
Frank Reisz,
684 The Arcade

Dallas, Texas
R. S. Wahfield,
1814 Allen Bldg.

Denver, Colo.
Fred E. Stahle,
Inc.,
2236 Blake Street

Detroit, Mich.
H. H. Norton,
2853 Wabash Ave.

Kansas City, Mo.
Robert Baker,
19 E. 14th St.

Los Angeles, Calif.
Frank Reisz,
684 The Arcade

Memphis, Tenn.
C. B. Rutledge,
303 Monroe Ave.

Minneapolis, Minn.
Lee H. Cooper,
422 Builders' Ex.

New Orleans, La.
W. J. Keller,
283 Natches Bldg.,
Magazine & Natches

New York
Fred G. Kraut,
419 W. 54th St.,
New York City

Omaha, Nebr.
R. J. Fleming,
212 S. 13th St.

Philadelphia, Pa.
W. A. MacAvoy, Jr.,
244 N. 10th St.

Pittsburgh, Pa.

Tulsa, Okla.
W. A. MacAvoy, Jr.,
214 S. Victor St.

St. Louis, Mo.
O. H. Bottman,
3650 Windsor Pl.

San Francisco, Cal.
Lee Van Atta,
340 Fremont St.

Seattle, Wash.
R. E. Dryer,
91 Connecticut St.

Toronto, Can.
Amalgamated Elec.
Corp., Ltd.

Montreal, Can.
Amalgamated Elec.
Corp., Ltd.
1006 Mountain St.

Vancouver, Can.
Amalgamated Elec.
Corp., Ltd.
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Winnipeg, Man., Can.
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Corp., Ltd.

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Amalgamated Elec.
Corp., Ltd.

1301 11th Av. East



In actual comparison, Fretz-Moon Conduit bends 25% easier than ordinary rigid conduit. It also bends freely to any requirement without distortion, flattening at the bend, opening at the weld, scaling of the galvanizing or cracking of the glass-like enameled inner surface.

All three Fretz-Moon brands are free-bending—ENAMELITE, black enameled; ELECTRO GALVITE, electro-galvanized; HOT DIPPED GALVITE, hot galvanized by a special process.

FRETZ-MOON TUBE CO., INC.
BUTLER, PENNA.

FRETZ-MOON RIGID CONDUIT

MINERALLAC PRODUCTS



1. Hanger without Par-
collet Bushing.
Spring steel; stronger,
quicker, more compactly
arranged.



2. Hanger attached to
steel beam with bolt
and nut.

3. Jiffy Clip—quicker,
neater work at less
cost.

4. Cable Joint or Pot-
head Compound—8
grades for every sys-
tem, underground or
overhead.

MINERALLAC ELECTRIC CO.
25 North Peoria Street, Chicago, Ill.



Subscribers

You can't afford
to miss a single
issue.

Give us your
new address if
you have
moved.

or replace defective goods. That is why I must sell better goods and charge a little more."

THEODORE KENT, of the Kent Electric and Hardware Co., San Francisco, perhaps should be called Theodore The First. He lays claim to having sold the first Ilg fan in San Francisco, and to being the contractor to sell the first Red Seal Home in San Francisco. The motto of his company is: "If Kent Can't, No One Else Can."

THE Powell Electric Company, Montgomery, Ala., have a keyless lock for their side door shop entrance. They push the signal button. Girl in office looks into mirror placed on angle and recognizes workers. Then she presses button releasing latch on door. This not only gives a burglar proof door lock but keeps the girl advised as to what men are available for repair jobs that may come in.

MCCARTHY BROS. & FORD of Buffalo, have prepared a beautiful 20-page brochure showing the character of electrical work they are set up to handle. More advertising of a similar nature by the other good contractors of this country would go a long way toward altering the industry's conception of the electrical contractor.

IN 1931 81.6 per cent of all the new homes built in Philadelphia were wired Red Seal. That's selling adequate wiring.

A. L. OPPENHEIMER, Enterprise Electric Lighting Fixtures, Inc., Cleveland, Ohio, has gone after lighting in a big way, selling units both in connection with installations and alone. He has seven salesmen concentrating on this work. All three major types of prospects are included in the sales attack, commercial, industrial and residential. The Enterprise firm recently supplied the fixtures for 125 houses in Pittsburgh.

THE Dixie Electric Co., Atlanta, Ga., makes contracts with real estate operators for all the repair and remodelling work to be done in their buildings. This plan gives the Dixie Company an assurance of a definite amount of work.

THE Hendricks Electric Company, Atlanta, Ga., has an unusual set up for a contractor. Just out of the high rent business district they have a construction office from which the bigger jobs are handled. Then in the exclusive outlying section they have a contractor-dealer store where appliances are sold and small repair jobs are handled. Men from the latter store can quickly handle small repair jobs and the retail business is good. They tell us that the cost of the two stores is less than one large one in the exclusive neighborhood.

*There are
TWO HAZARDS here*

*TEST FOR ONE
The
Twilight
Zone**

*This advertisement ap-
pears in National Safety
News for April, 1932.*

**TURN *Twilight Zone* TESTS
TO PROFITS . . .**

TO all branches of business, Westinghouse is directing a campaign for better lighting. "Test for Twilight Zone", the theme of this campaign, is being carried in advertisements, of which the above is typical, to stores, factories and office buildings the country over. These challenging printed messages are stimulating lighting business.

Go out and capitalize this opportunity. You can turn the Twilight Zone test into a profitable sales talk in selling lighting.

The next time you call on a prospect, pick up his phone book. Open the book at random. Does every word stand out sharp and clear? Move to various spots where people work. Can you and your customer read any name, address, or number rapidly, without effort? If you can't—if you have to squint and draw the book closer to your face—you have demonstrated that he has Twilight Zone lighting.

If you want to do the best kind of a job for your customer, install Westinghouse lighting. Explain to him that lighting's largest expense, the cost of operation, is lowest with efficient, quality equipment.

*The deceptive half-light between obvious darkness and adequate illumination.

Westi
Quality workmanship

Westinghouse
T 7902
Quality workmanship guarantees every Westinghouse product

PAINE

Spring Toggle Bolts

FOR FASTENING ANY
OBJECT TO A HOLLOW
WALL, FLOOR OR
CEILING



Operates instantly in any position
in any hollow material

MADE IN 7 SIZE BOLTS

Standard for 13 years with electrical trade from coast to coast

The Paine Company

2945 Carroll Avenue - Chicago, Ill.
79 Barclay Street - New York City

PRACTICAL METHODS

REVOLVING STAND FOR ARMA- TURE WINDING

Instead of using a permanent stand for armature wiring the Anderson Motor Repair Co., Charleston, S. C., has this revolving stand that enables the worker to wind without twisting



Wires Cannot Twist

the wire. It winds more uniform because the operator can always see that the wires are kept in parallel. The wire is tighter and stand may be revolved from left to right or vice versa.

The armature shaft is held in position by set screws with lock nuts. The frame is mounted on ball bearings.

BELT VS. POCKETS FOR TOOLS

Hugo James, proprietor of the Union Electric Co., Portland, Ore., does not believe in carrying all his tools in his pockets. First, they are awkward to get at and second, they are always ripping and wearing out the pockets. So he has adapted a Klein hip pocket tool case to a somewhat different method of "mounting" by riveting it to a belt as seen here, which takes the weight off the pocket and at the same time brings the tools farther around toward the front where he can get at them more easily. He was asked to disgorge the contents of the holder on the counter in his store and here is what



Special Offer

(Limited Time Only)

\$2.00 ELECTRICIANS'
HAMMER
FOR **\$1.50**
(Former Price)

An Electrician designed this hammer. The long poll (2 inches) makes it easy to reach into outlet boxes, over pipes and into corners. The claw is built for prying. The handle is seasoned hickory.

FREE With each order for a hammer we will send free one Electricians' Cold Chisel.

MAIL COUPON TODAY

EVANSVILLE TOOL WORKS, INC.
EVANSVILLE, INDIANA.

Gentlemen:
I am enclosing my P. O. money order for \$1.50.
Please send me, postpaid, the No. 77 electricians'
hammer and free cold chisel.

My Name.....

Address.....

City.....



dependable-

at low cost

An outstanding development in the field of modern clock engineering. Complete in every detail for effectively performing all known time switch operations. Neat, compact, and sturdy in design and construction. Low in price due to simplicity and modern methods of manufacture and unconditionally guaranteed. Write for full information and liberal dealer's discounts. We have the answer to all your key-wound and electrically-wound time switch problems.



ARMSTRONG BROS. Improved Pipe Dies



ARMSTRONG BROS. Pipe Dies are easy cutting for they have clearance (1) from the cutting point and are free from frictional drag. They cut smooth threads for chasers are of Vanadium Tool Steel—take a keener edge and hold it. They back off pipe end easily, without tearing or jamming thread. Other features of these dies include: (2) Solid support behind chasers which are cast-welded into die body. (3) Correct Cutting Angle. (4) Ample Chip Clearance.

Each ARMSTRONG BROS. Pipe Tool is an improved tool designed after careful tests of other types and makes. They are distinguished by the Arm-and-Hammer Trade Mark. Write for Catalog F-10 and Circular describing new Pipe Vice Saddle.

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

341 N. Francisco Av., CHICAGO, U. S. A.

"THEY KEEP A-RUNNING"



SELL *Comfort* and *Satisfaction*

COMFORT, because...

They move an unusually large volume of air—distributed over a wide area by the slow oscillating motion. . . . The three speeds give the right volume of air for different temperatures.

SATISFACTION, because...

They are built to last a long time and "Keep a-Running" year after year. . . . Serviceable—easily moved and the direction and volume of air is easily adjusted.

Century Fans give complete satisfaction.

Century
FANS

CENTURY ELECTRIC COMPANY, 1806 Pine St., St. Louis, Mo.
40 U.S. and Canadian Stock Points and More Than 50 Outside Thereof

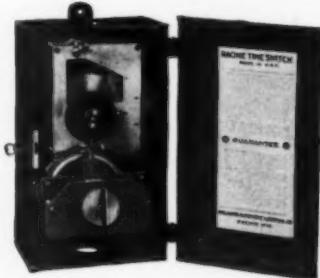
Fan Blade Assembly
The sharp curve in
each blade near the
center of the blade
assembly makes the
entire blade area
effective.



FOR MORE THAN 28 YEARS AT ST. LOUIS

F-410

**STUDY THESE
7 DISTINCTIVE
FEATURES**



Seven reasons why the Racine 8-Day Automatic Time Switch is the leader—

1. Three units only—clock—switch mechanism and snap switch—all interchangeable.
2. Entire mechanism removable.
3. Light (ON) hand and dark (OFF) hand travel in separate planes performing separate duties.
4. Thumb screw adjustment sets dial and hands in 5 seconds.
5. Can be hand operated without interfering with setting.
6. Switch mechanism indicates whether switch is on or off.
7. Low price.

Write for Bulletin 88.

**RELIANCE AUTOMATIC
LIGHTING COMPANY
RACINE, WISCONSIN**



Easy-to-get-at Tools

it contained at the moment: 1 screwdriver, 1 bit, 1 pr. side cutters, 1 ice pick, 2 files, 1 knife, 1 cold chisel, 1 punch and three hacksaw blades. Just to prove that nothing is ideal, Mrs. James made him turn around and show that even at that he still carried his rule and two or three other things in his back pocket.

To make the tool holder more adaptable to belt carrying, he has lined it with tin, which makes it a little stiffer and saves the leather.

DIRT CATCHER

To catch dirt in old house wiring, a piece of canvas about a yard square is used in place of the usual newspaper. On one end of the canvas is fastened a piece of galvanized sheet



iron bent in an L shape to fit against the wall. It is held against the wall by suction cups having a small brass strip fastened to them, with a bolt. These cups will stick just as well to the baseboard. The other end of canvas has also a strip of sheet iron which this allows the canvas to be picked up easily. This canvas also protects the floor from scratches.

**A
BIG
MONEY SAVER**

Eliminates triple handling—unwinding—measuring and rewinding wire, thus saving time and money. Manually operated—reels wire into neat coil, automatically counting and registering number of feet. Strongly built of heavy selected materials so as to last a lifetime.

It Pays for Itself

Send for bulletin
Write us or your jobber

**Minneapolis Electric
and Construction Co.**

80 S. 12th St.

Minneapolis

Minn.



**SHERMAN
LUGS!**



Side Formed
Lug
Patented approved

You'll find the Sherman Line of Lugs complete and of highest quality—The Soldering Lugs are seamless all around—prohibit solder leaks—give better conductivity—are of correct gauge. Furnished with round or square end.

The heavy duty Sherman Soldering Lugs are N.E.L.A. specifications—of best grade seamless copper tubing—flat contact surface—free from burrs, and other mechanical faults which impair electrical or mechanical service on the job.

Samples of smaller sizes gladly mailed you—write us and be convinced.

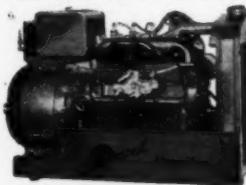
H. B. Sherman Mfg. Co.

BATTLE CREEK,
MICHIGAN



Heavy
Duty
Soldering
Lug

Smallest, most compact, 4 cyl. Electric Plant



**WANT NEW
BUSINESS?**

Universal Electric Plants are being successfully and profitably sold in the following fields:

EMERGENCY LIGHTING
for hospitals, theaters, etc.

CONSTRUCTION CONTRACTORS

Camps, mines, construction projects, etc.

REFRIGERATING PLANTS on trucks

PLEASURE YACHTS

BEACON LIGHTING

CIRCUSES

SUMMER CAMPS, RESORTS,

and COTTAGES

RAILROADS

LARGE AIRCRAFT

RADIO SOUND TRUCKS

Go after this business! With the proven dependability of the UNIVERSAL PLANT you can guarantee 100% satisfactory service. With the specialized background we have established in this field—we can provide you with expert technical data to clinch the sale for any type of industrial, commercial or marine installation. The Universal Line ranges from 1 to 35 K.W.—AC and DC—32, 110 or 220 volts.

UNIVERSAL MOTOR CO.
318 Universal Drive

Oak Park, Ill.

We have an
unusually at-
tractive prop-
osition to put up
to you. Write
for full partic-
ulars.



A LOWER LIST PRICE and A BIGGER MARKET



G-E Handy Floodlight

for the
**G-E HANDY
FLOODLIGHT**

The *list price of the HANDY
has been reduced to

\$5.80

The unprecedented demand for the HANDY, resulting in substantial economies in production without changing design or quality, has made it possible to pass on to the trade the advantages of this reduction in price.

In view of this change, the outstanding sales value of the Handy will be greater than ever: its light weight—only 2 pounds, 14 ounces; its easy portability, strong construction, and handsome appearance; its easy adjustment in any direction; its long, wide beam from a 100-watt inside-frosted MAZDA lamp; and the same market—greatly enlarged: for use and decoration in scores of applications, city, suburban, and rural.

And remember also the Senior Handy (new *list price \$12.80)—for use where a higher intensity is desired; takes a 200-watt inside-frosted lamp; small in size and light in weight for so powerful a floodlight.

*Does not include freight or lamp.

Distributed by:

THE

GENERAL ELECTRIC SUPPLY CORPORATION
Other G-E Merchandise Distributors
Any G-E Sales Office



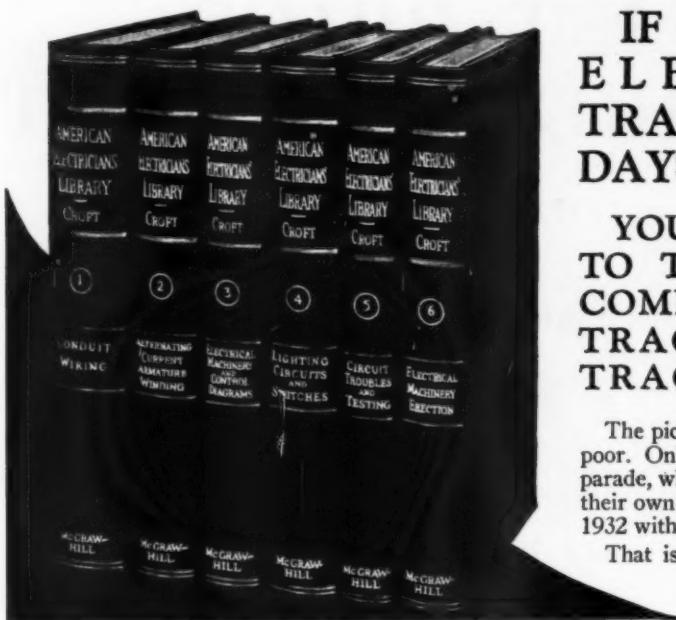
G-E Senior Handy Floodlight

JOIN THE "G-E CIRCLE"—SUNDAYS AT 5:30 P. M. E. S. T. ON N. B. C. NETWORK OF 54 STATIONS—WEEK-DAYS (EXCEPT SATURDAY) AT NOON
710-151

GENERAL ELECTRIC

SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES





IF YOU WANT TO GET ELECTRICAL CONTRACTING JOBS THESE DAYS . . .

YOU MUST BE PREPARED TO TACKLE ANY JOB THAT COMES ALONG. ANY CONTRACT IS A GOOD CONTRACT NOW.

The pickings are easy no longer—in fact they are mighty poor. Only those contractors who are keeping ahead of the parade, who are constantly expanding their knowledge about their own business, are the ones who are looking forward to 1932 with much hope.

That is why you should READ THIS PAGE CAREFULLY and be honest with yourself in estimating the value of this Library to you.

TERRELL CROFT'S American Electricians' Library

(6 volumes—over 2,000 pages—fully illustrated)

Six well-bound, handy volumes make up this library. They are: 1. Conduit Wiring. 2. Alternating Current Armature Wiring. 3. Electrical Machinery and Control Diagrams. 4. Lighting Circuits and Switches. 5. Circuit Troubles and Testing. 6. Electrical Machinery Erection.

DIAGRAMS

There are more than 1,000 clear, easy to follow diagrams in these six books. The wiring instructions are in simple language.

Like other Terrell Croft books—these books are prepared for use by practical electricians.

GENERAL

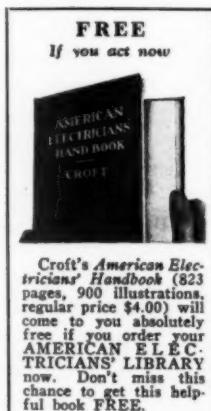
They show how to make installations for every type of conduit wiring job—they tell how to handle every kind of lighting and switch problem—they give tips on short cuts for saving time on routine jobs—they show the quickest and surest methods of locating and remedying circuit troubles. In short, they give you the "how" and the "why" of every job you are ever likely to be called upon to tackle.

REPAIRS

Repair work is often the real test of an electrician's skill. It is in "trouble shooting" that he gets a chance to show up as an expert or "just another electrical man." This Library tells you just what to do and how to do it whenever a piece of electrical apparatus goes wrong. There isn't a repair problem you can't solve if you have this Library to help you.

REMEMBER

The man who is getting business and holding his own today is the man who knows more about his job than the next fellow. Here is your chance.



TERRELL CROFT

Terrell Croft has been through the mill of practical experience. He started at the bottom as an electrical helper and worked his way up the ladder of success until today he ranks among the few consulting engineers who are known in the country over. He writes the kind of books he wished he had had when he was on the way up—helpful, informative, practical, and easy to understand. It is because he has done the work himself that you will gain so much from these Croft books.

FREE EXAMINATION

Some tell us that we should not send our books out on our 10 Days' Free Examination Plan—that people will not buy books after they have looked through them. But we know OUR BOOKS. We know that they STAND UP under examination. So fill out the coupon below and see if you do not agree with us. It costs you nothing—not even postage.

EASY MONTHLY PAYMENTS

At the end of 10 Days, if you decide to keep this Library, send us only \$1.50 and then \$2.00 a month until the Special Price of \$17.50 has been paid. Otherwise, return the Library to us, at our expense. Be sure to read the Free Offer in the center of this page.

MC GRAW-HILL FREE EXAMINATION COUPON

McGraw-Hill Book Co., Inc., 330 West 42nd Street, New York

Gentlemen: Send me for 10 days' free examination, all charges prepaid, the AMERICAN ELECTRICIANS' LIBRARY, 6 volumes. If I find the books satisfactory, I will send you \$1.50 in ten days, and \$2.00 a month until the Special Price of \$17.50 has been paid. If they are not what I want I will return them. Upon receipt of my first payment you agree to send me a free copy of Croft's AMERICAN ELECTRICIANS' HANDBOOK.

Signature

Residence Address

City and State

Firm or Employer

Occupation

E.C. 3-32

Now! a practical, handy key to the National Electrical Code



Work according to the Code. Use this quick guide to the rules and requirements for all jobs—what they mean—how to apply them. This unusual book, planned for quick reference use by busy, practical men can also be used by anyone who wishes to make a thorough study of the National Electrical Code in classes or at home.

- Just Published - National Electrical Code HANDBOOK

By Arthur L. Abbott

460 pages, 5 1/2 x 8, fully illustrated, \$3.00

THE purpose of this book is to enable the user to grasp readily the plan, scope and purpose of the National Electrical Code requirements, to present discussions of the rules wherever this will clarify them, and to make the practical application of the rules clear and easily understandable.

All requirements of the Code are included in this Handbook but have been grouped according to the subjects to which they apply. For instance, if you want to know the rules for wiring under certain conditions, you can be sure that all of these are included in Section II of the Handbook. At the same time some of them are repeated in other sections in connection with more specific jobs. By this special arrangement you can refer to any point quickly with the assurance that no rule applying to the subject will be overlooked.

Every Code rule has been made clear and understandable. Comments, explanations, diagrams and sketches have been inserted wherever they are needed. Some rules have been restated where the meaning could be brought out more simply.

Valuable data for the electrician, inspector, contractor and architect

- definitions of the terms used in the Code
- types of wiring approved under given conditions
- requirements pertaining to standard materials and apparatus and to the standard methods of installing such materials and apparatus
- general requirements applying to all wiring systems
- automatic overload protection covered both in section on general requirements and in connection with specific applications
- simplified application of Code data pertaining to motor installations
- special requirements pertaining to outside work, hazardous locations, theatre wiring, elevators, cranes, signs, radio equipment, etc., etc.

10 Days' Examination FREE

This book will help you to certify your methods by making quick, frequent, definite reference to Code requirements an easy matter. See for yourself this unusual book. Let us send it for 10 days free. Base your decision on the book itself. Send the coupon now.

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City and State.....

Occupation

Company

E.C. 3-32

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for
STORES**

No. 85

No. 85—Unwired unit, length 8½ inches; drawn of brass, hinged porcelain socket. Standard finish, statuary bronze plated. For T-8½ tubular lamp.

No. 95

No. 95—Unwired unit, length 9 inches; made of brass, porcelain socket. Standard finish, statuary bronze plated. For Standard lamp to 60 watts.

BANKS

No. 1012

No. 1012—Standard 18-inch reflector with clear glass; made of brass or steel, with steel porcelain enameled reflector and twin porcelain sockets. For Standard lamp to 40 watts.

No. 2600

CASHIER

No. 2600—Thin model sign for clear plate glass; outer frame, drawn bronze moulding; porcelain socket, intermediate base for T-8½ lamp. Any standard finish.

SCHOOLS

No. 180

No. 180—Bracket light—length 9 inches; made of brass; porcelain socket, for T-10 tubular lamp. Standard round canopies and stems.

No. 720

No. 720—Picture reflector—length 9 inches; made of steel; porcelain socket for T-10 tubular lamp. Standard finish, gold spray.

BUILDINGS

No. 5050—Aisle light—
square 4 11/16 inches
deep; by 2 1/4 inches
wide; furnished com-
plete with outlet box,
porcelain enameled re-
flector, sign receptacle
and louvre cover. In-
termediate base socket used for 8-11 lamp.



No. 5000—Pit re-
flector—length 17
inches; body, frame
and guard with
Udylite rust
proofed finish;
glass is Pyrex heat
resisting. Sockets, twin
porcelain for two
lamps of 100 watt each.

DAY-BRITE COMPANY
3825 Locust Ave. - Saint Louis

NEWS MANUFACTURERS

A DEPARTMENT FOR THE ANNOUNCEMENT OF ACTIVITIES OF MANUFACTURERS THAT ARE OF INTEREST TO CONTRACTORS, SUCH AS CHANGES IN EXECUTIVE PERSONNEL, BRANCH OFFICES, NEW PRODUCTS, ETC.

ALLEN-BRADLEY EXHIBITS MOTOR CONTROL

A complete exhibition of modern electric motor control for all industries was held by Allen-Bradley Co. of Milwaukee, Wis., in the Engineering Building, Chicago, during the month of February. Eugene F. Le-Noir was the engineer in charge. The controls exhibited ranged in size from small push-button stations and photoelectric relays to automatic high-tension motor starters of several hundred horse-power rating, and included standard, water-tight, dust-tight and explosion-proof apparatus.

The exhibit will next be shown in Cincinnati, Ohio, during March.

BURGESS LABORATORIES TO SELL ELECTRONIC DEVICES

C. F. Burgess Laboratories, Inc., 202 East 44th St., New York has taken over the activities of the Burgess Battery Co. in the sale of Burgess Radioviser bridges (light-sensitive cells), vacuum contacts, vacuum contact relays, micro relays, light control units and other electronic devices, as well as the acoustimeter line of the Burgess-Parr Company.

WILL MARKET OUTDOOR ELECTRICAL DEVICES

A new corporation has been formed to market flashers, time switches and other accessories used to control motion and color in outdoor electrical advertising, known as Outdoor-lighting Controls, Inc., with James H. Betts as president. The headquarters of this new company are located in the Graybar Building, 420 Lexington Ave., New York City.

Outdoor-lighting Controls, Inc., will handle the sale of all types of Leland mercury tube flashers; the James H. Betts, Inc., motor driven brush flashers; a new type of synchronous motor driven Tork clock with metallic contacts, and the most complete assortment of color caps made.

COMMERCIAL RE-WIRING BOOKLET

A booklet covering all of the sales phases of commercial building re-wiring has just been printed as a sales manual for electrical contractors by the Merchandise Division of the General Electric Co., Bridgeport. After developing statistics of the market the manual presents different sales methods for reaching this market and concludes with a complete series of sales letters.

This manual is one of a series of similar manuals for the development of other important wiring markets.

Weston Electrical Instrument Corp., Newark, N. J., has just issued a pamphlet describing the Model 603 Weston Illuminometer. This pamphlet fully describes and illustrates this model, containing a list of the advantages of the use of this illuminometer in electrical work.

Reynolds Electric Co., Chicago, Ill., has just published Bulletin 50 covering motor driven flashers, mercury and brush types for electrical displays. This bulletin contains layouts showing installation methods and wiring diagrams, as well as price-lists. It is also completely illustrated with the different units manufactured by Reynolds Electric Co.

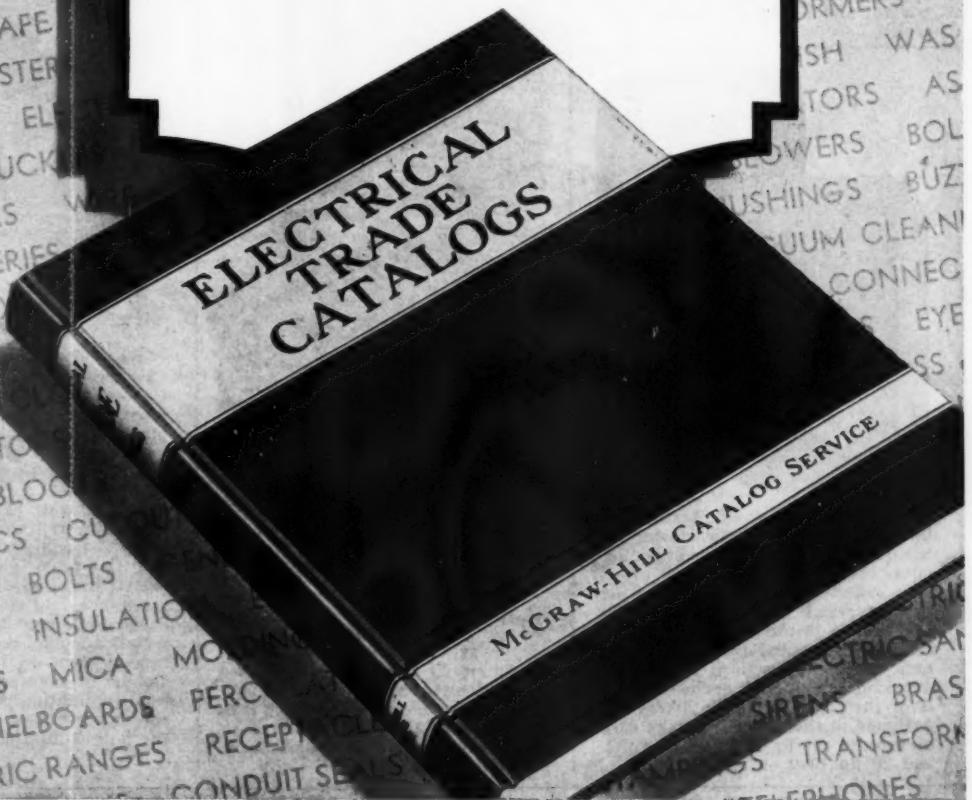
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with the aid of

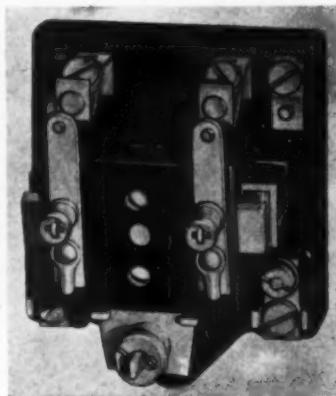
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Go after orders with **ELECTRICAL TRADE CATALOGS**. Manufacturers have placed their catalogs in this file for your convenience. Use it also to help you place orders and in estimating.



New Electrical Products



The Industrial Controller division of the Square D Co., Milwaukee, Wis., announces two new sizes of magnetic contactor of small ampere capacity, known as types H and K, rating from 3 to 15 amp. for non-inductive load or fractional h.p. ratings for 110-volt, single-phase motors. Units have laminated magnet frames, floating armatures, silver to silver contacts, porcelain bases, approved temperature and insulation standards and voltages up to 220 volt for type H and 440 volt for type K. Units are built in combinations of single and double pole, single and double throw circuit opening and closing, 2 or 3-wire control and 3-wire thermostat control.



An explosion proof, across-the-line type, a. c. automatic starter for hazardous locations has been announced by Cutler-Hammer, Inc., Milwaukee, Wis. Starter is of air break type, all contacts being made and broken in the air. Unit is constructed of a standard, 3-pole, magnetic contactor, with C-H thermal overload relays. The enclosing case is of the "split" type. Starters are designed in three sizes, to take care of motors up to 30 hp., 220 volts, and 50 hp., 440 or 550 volts.



Separable rubber attachment plugs, adapted to a wide range of cord sets motor driven machines and appliances, are announced by The Bryant Electric Co., Bridgeport, Conn. Plugs are made of high-grade new para rubber; interior fits snugly; shank grips the conductor cord, and wires and terminals are separated by barrier with complete protection for plug end. The plug is flexible but not too pliable. The separable feature makes it possible to take up or replace mutilated cords.



Type CBS circuit-breaker fitting and CBS panelboard, designed to take Westinghouse "Filpon" type WKL circuit breaker have been developed by the Pyle-National Co., Chicago. These fittings are of heavy duty cast-iron. Circuit breaker fitting is made in types to take one single pole, two single pole or one double pole breaker. Operating handle of circuit breaker projects through front cover of fitting protected by two ribs on cover. Fitting can also be furnished with a weatherproof cover in which an operating rod engaged the operating handle of the Filpon circuit breaker, which is used for outdoor locations. Standard panelboards are made to take from 2 to 10 single pole circuit breakers or any combination of single and double pole circuit breakers.



The Ralco Manufacturing Company of Chicago have added to their line of explosion resisting fittings, the XPU universal gasoline pump junction box, with ten openings tapped for $\frac{3}{4}$ -in. conduit. Boxes are of cast iron with brass screw covers.



Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announce the Violite adapter for dual-purpose lighting, which is a combination of general interior illumination plus ultra-violet irradiation. The adapter consists of a socket for a 200-watt ballast lamp and an aluminum reflector and socket for type G-1 ultra-violet glow lamp. The G-1 lamp is in series with the ballast lamp, which acts as a ballast resistance and no transformers or other equipment are necessary. To install adapter, remove cap at bottom of standard 14-in. Sollux globe and screw adapter into socket of the regular lighting lamp. The reflector at bottom of the adapter closes the hole in bottom of the globe.



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By adopting the NATIONAL ELECTRICAL RESALE PRICE SERVICE you are acquiring a "Silent Partner," who will work for you every hour of the day, every day of the week, without complaint — helping you to turn losses into PROFITS.

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You, no doubt, buy right but are you certain that your selling price includes a Profit? You don't want to overcharge a good customer, yet you are entitled to a fair price—take your customers into your confidence, show them the price in the book—this proves that you are prepared to give them the benefit of changes in prices as quickly as they occur, at the same time offers silent testimony that your prices are fair and that you charge everyone alike.

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If you have been dissatisfied with your profits, here is something that will make money for you every day in the year. We have issued a little booklet which describes in detail this unusual Service that successful contractors are using daily to increase their profits, save time, and build customer confidence. Would you like to read it? It's yours for the asking; simply attach your letterhead to the coupon below.

**Henderson-Hazel Corporation,
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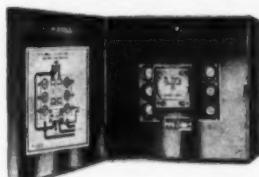
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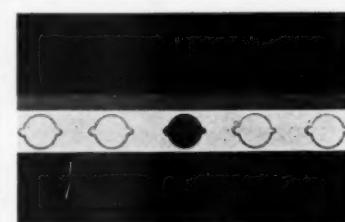
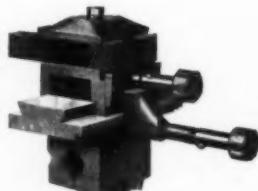
New Electrical Products



The Trumbull Electric Mfg. Co., Plainville, Conn., is now manufacturing a line of range panels, providing a combined fuse holder and range disconnect unit together with either 2, 4 or 6 branch circuit cutouts with plenty of wiring room in a minimum sized box. Panels can be furnished for either flush or surface mounting. Flush type has gray finish and surface type black enamel. A shield covers all live terminals which is removable for wiring.



A line of pendant-type, momentary-contact push button stations, designated Type CR-2940, is announced by General Electric Co., Schenectady, N. Y., primarily for control of motors driving machine tools, such as planers and boring mills. The momentary-contact push-button unit provides both a normally-open and normally-closed circuit; movable contact is a silver-plated disc held against two top contacts by a spring. Units are mounted on front of case with screws. Enclosing case is of cast aluminum alloy with black japan finish, and entire back of case is removable.



The Permafelector knock out strip, announced by Pittsburgh Reflector Co., Pittsburgh, Pa., is a wiring duct or conduit for unit assembly of reflector type illumination equipment, and has accessory fittings including knock out socket, coupling end, fitter, joint, box, hub, bracket, hanger and U-strap, which constitute a standardized system for installing show window lighting and other reflector jobs. Strip is furnished in 10 ft. lengths with suitable shaped knock outs spaced 3 in. on centers, 1 1/2 in. square, providing for quick installation of sockets on any desired spacing and consisting of two main parts, face and back. It is also possible to turn corners vertically as well as horizontally, and strip requires no bending, drilling or punching and a minimum amount of cutting on the job. Material is corrosion-proof and finished in standard Permafelector silver colored satin finish.



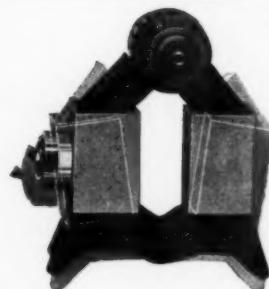
The Bryant Electric Co., Bridgeport, Conn., announces No. 4333 duplex 3-wire polarized receptacle with completely enclosed base, with terminals for top wiring for use with grounded conductor in circuit wire and covered with bakelite plate, of which bosses are a part. No. 4323 is the same device with grounded yoke for use with BX cable.



Marbelite Art Products Co., Chicago, announces Marbelite in two types—No. 505 spotlight and No. 506 floodlight. Unit has ventilating louvres in neck, is made on symmetrical lines, has cast arm and bracket replacing old strap iron bracket, which is easily adjusted and positive lock. Unit is made of highly polished genuine Rayalium and has gelatine retaining shutter, and is complete with 6 assorted color screens, 4 ft. heater cord and detachable plug.



"WHEELaLITE," an adjustable utility light, is announced by Wheeler Reflector Co., 275 Congress St., Boston, Mass., for use as a mechanic's worklight and inspection light. The lighting unit is mounted on a truck equipped with 4 casters. Reflector is adjustable vertically so that light can be directed wherever desired. Glass lens in mouth of reflector is protected by wire guard. Unit has a low overall height, and accommodates a 75 or 100-watt inside frost lamp, wired complete with socket, 25 ft. of rubber service cable, and plug.



Ideal Commutator Dresser Co., Sycamore, Ill., announces a new line of motor repair tools, including "Midget Model" precision grinder for use on small commutators having a face width of 8 in. or less, as well as medium slip rings, and is also adapted for brush arms; a centerless micro undercutter for fractional horsepower motors and small armatures up to 5 in. in diameter; and adjustable growlers for locating shorts, grounds and opens in armatures, stators and coils.

DIAMOND ACQUIRES DENVER PLANT

The Diamond Electric Mfg. Co., Ltd., of Los Angeles and San Francisco, which is affiliated with the Square D Co., has purchased S. L. Mosher Co. of Denver, Colo., manufacturers of panelboards, cut-out boxes and similar products, effective January 1. The Denver plant will serve the states of Colorado, Utah, Wyoming, New Mexico, Montana and Idaho.

BOOKLET ON RADIO NOISES

"Radio Noises and Their Cure" is the title of a new 76-page booklet just published by Tobe Deutschmann Corp., Filterette Division, Canton, Mass. In addition to photographs showing different types of interference and different applications of the filterette and its uses, the booklet also contains wiring diagrams and specifications for installations of the filterette to prevent radio noises.

Aluminum Company of America, Pittsburgh, Pa. has just published a booklet entitled "Channeluminum Electrical Conductors of Alcoa Aluminum". Channeluminum is used mainly for bus bars and feeders, and the booklet contains tables and specifications for installation of this material, and is profusely illustrated with actual photographs showing these conductors installed. In addition the booklet contains tables and specifications showing different sizes of channel tensile strength, length, tolerance and finish.

Bulletin 502 on explosion resisting conduit fittings and control switches, is now being distributed by the O. C. Keckley Co., 565 Washington Blvd., Chicago.

Classified Advertising

For Sale: Long established Electrical Contracting and Repair business. On corner lot with 8 room, up to date home on premises, now used as two apartments. Owner's failing health requires retirement. Paying business with small over-head. Box 66, Augusta, Ga.

Estimator Available: Electrical estimator (18) eighteen years experience can make own layouts. Desires to connect with first class construction firm. References furnished upon application. Box 31, ELECTRICAL CONTRACTING, 520 N. Michigan Ave., Chicago, Ill.

Repeat Orders

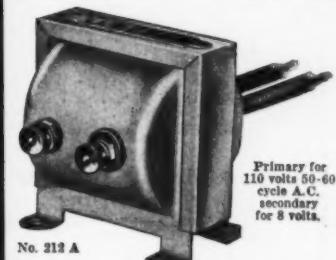
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Judging from the repeat orders from electrical contractors everywhere, GALVADUCT Rigid Steel Conduit must be very good.

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Assure dependable service by installing a Liberty Transformer. Approved by National Board of Fire Underwriters and fully guaranteed.

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SHEATHED CABLE**

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Alphaduct
products
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Index to Advertisers

A

Adam Electric Co., Frank.....	87
Alphaduct Co.	102
American Blower Corp.	36
American Steel & Wire Co.	68
Ansonia Electrical Co., The.....	32
Appleton Electric Co.	81
Armstrong Bros. Tool Co.	90
Arrow-Hart & Hegeman Electric Co., The	71
Automatic Electric Co.	86

B

Benjamin Electric Mfg. Co.	26-27
Bussman Mfg. Co.	21

C

Central Tube Co.	75
Century Electric Co.	91

D

Day-Brite Reflector Co.	96
Diehl Mfg. Co.	104
Dunn, Inc., J. Struthers	74

E

Edwards & Co., Inc.	22-23
Evansville Tool Works, Inc.	90

F

Fairbanks, Morse & Co.	33
Fretz-Moon Tube Co., Inc.	88

G

Garland Mfg. Co.	101
General Cable Corp.	85
General Electric Co. ....	...
.....35, 70, 71, 79, 83, 93, Back Cover	
Graybar Electric Co.	4
Greenlee Tool Co.	82

H

Henderson-Hazel Corp.	99
----------------------------	----

I

Inland Glass Works, Inc.	78
-------------------------------	----

K

Keckley Co., O. C.	76
Killark Electric Mfg. Co.	69
Koch & Co., Paul W.	101

L

Liberty Bell Mfg. Co., The.....	101
---------------------------------	-----

M

Martin & Sons, H. P.	101
McGill Mfg. Co.	80
McGraw-Hill Book Co., Inc.	94-95
McGraw-Hill Cat. & Dir. Co., Inc.	97
Mineralac Electric Co.	88
Minneapolis Electric and Construction Co.	92

N

National Electric Products Corp.	Front Cover
---------------------------------------	-------------

O

Okonite Co., The.	34
------------------------	----

P

Paine Co., The.	90
Paragon Electric Co.	90
Plainville Electric Products Co., The	101

R

Ralco Mfg. Co.	25
Reliance Automatic Lighting Co.	92
Roebling's Sons Co., John A. ....	.....Inside Front Cover

S

Sangamo Electric Co.	30-31
Sherman Mfg. Co., H. B.	92
Standard Transformer Co., The....	101
Steel & Tubes, Inc.	2
Steel City Electric Co.	29

T

Thompson & Son Co., The Henry G.	24
Triplex Products Corp.	103

U

Universal Motor Co.	92
--------------------------	----

W

Wadsworth Electric Mfg. Co., Inc., The	84
Wagner Electric Corp.	77
Westinghouse Electric & Mfg. Co.52, 53, 89

Y

Youngstown Sheet & Tube Co., The	Inside Back Cover
--	-------------------

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... from the hot, steamy air in laundries . . . fumes in chemical plants, uncomfortable temperatures in industrial plants—these are but a few instances of where Diehl Ventilating Equipment can be sold and installed with profit to you.

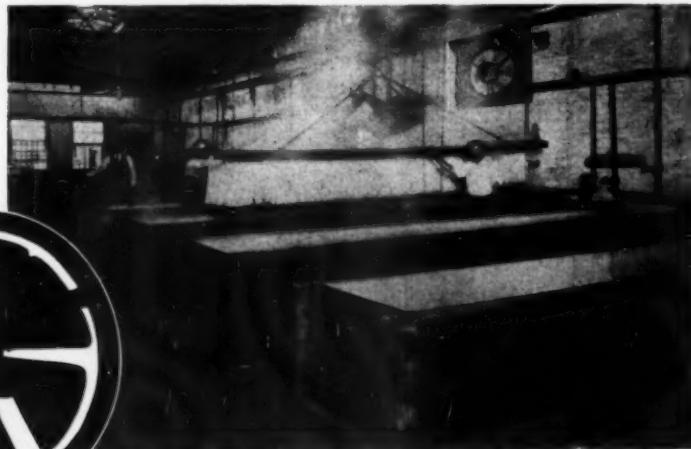
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ELIZABETHPORT, N. J.

Atlanta Boston Chicago Columbus Dallas New York Philadelphia St. Louis

DIEHL *fans*
FOR EVERY VENTILATING NEED —



Diehl Fans
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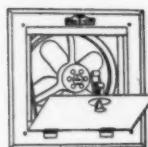
9", 12" and 16" Flat
Blade Ventilating Fans



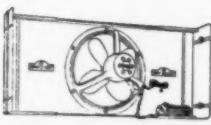
9", 12" and 15" Bucket
Blade Ventilating Fans



32", 52" and 56" Re-
versible and Non-Reversible
Ceiling Fans



Wind-O-Vent Wall Cab-
inet Unit with Louvres



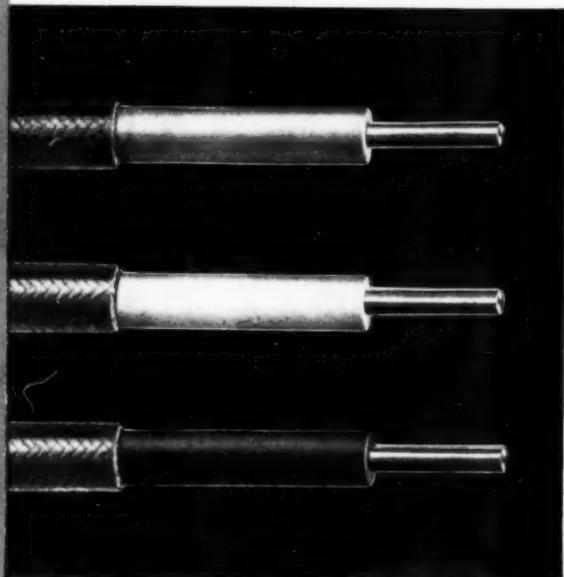
Wind-O-Vent Ventilator
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G-E Merchandise Distributors are located in all parts of the country. There is one near you. Let him help you with your wiring problems, or if you do not know where to find him, write to Section W-323, Merchandise Dept., General Electric Co., Bridgeport, Conn.

GENERAL ELECTRIC
WIRE AND CABLE

MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONNECTICUT

